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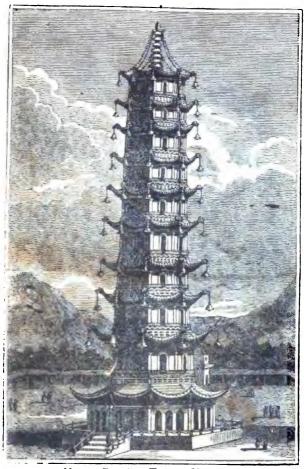
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PREFACE

The Ancients builted of their Seven Warman of the World, but this work will prove that the Moderns may hour of their Hennium Worlden.

To embine these wonders, whether of nature, or of not, and to bring them mus a comprehensive form, from the different stores in which they may be said to have been hitherto looked up, has been the nim of the editor of them pare. They are level drawn into light, and exhibited at a stogle view, presenting whatever the genius and we

dustry of man have been able to effect, in order to excite admiration at the sub-limity of his conceptions, the depth of his scientific researches, and the grandeur of those structures, many of which have subsisted, almost unimpaired, for a long succession of ages, in testimony of his consummate skill, which could thus achieve monuments, at once so splendid, and of so imperishable a nature!

Those maryellous relations which the mischievous fancy of travellers has too often imposed on the credulity of the weak, as well as the fables founded in bigotry, which were received as truths in the dark ages, have been sedulously shunned: where the subjects treated have incidentally led to them, they have, on the other hand, been as carefully ex-

princed. This whitevery two limes my firmed by the concurrent testimony of enfightened writers, has been faithfully digested from their works. Whether on the subjects to which nature, in the different departments of herempire, and In the bestewal of her subline gifts and attributes, displays harself in har most magnificent after cor on those in which art has comstepped the ordinary hounds assigned to the faculties of man; the best unthavities have been throughout consulted. The editor, therefore, theters himself that, in ennipiling and uscombling so many objects of wonder and delight. he has conferred a real benefit. on the vising generation, and that his taliance will not be dischained by there. even, whose reconcerby into this will

LIME WONDERS OF NATURE AND OF ART, have engrossed the chief of their attention.

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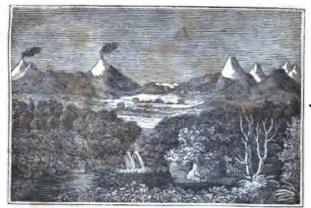
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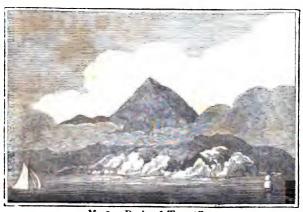
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No. 2 .- The Andes near Quito.



No. 3 .- Peake of Teneriffe.

WONDERS OF THE WORLD,

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CHERRIC RINGHOMS OF NATURE.

THE MOUNTAINS OF THE ANDES,

IN WITTE AMERICA.

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A mages the wonders, or uncompared phenomens at the world, may be channel superious Meanings; and a these in Ander, in South America, are the littless, the most expense, and, therefore, the most wonderful. Occupients of objects which are stilling, because they are sunt, often in the religion appropriate along and however, are not perform up perform a programmer of the channel and Source to Produce, on not underso at their volumes of Nation's Produce, on not underso at their volumes are becomes on the contract of the any written or graphenel representation. The magnitude of an object course to some to be duly conveyed, and common was torn will be founded by those who have yet and common was torn will be founded, in the monature was regions of America of America of America.

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a single group, which is continued far beyond the equator. In the kingdom of Quito,* the more elevated summits of this group are ranged in two rows, which form a double crest to the Cordillera. The extent of the Andes Mountains is not less than four thousand three hundred miles.

Rocks rich in gems, and mountains big with mines, That on the high equator ridgy rise, Whence many a bursting stream auriferous plays.

THOMSON.

In this country the operations of nature appear to have been carried on on a large scale, and with a bolder hand, than elsewhere; and in consequence the whole is distinguished by a peculiar magnificence. Even the plain of Quito, which may be considered as the base of the Andes, is more elevated above the sea than the summits of many European mountains. In different places the Andes rise more than one third above the famous Peak of Teneriffe, the highest land in the ancient hemisphere. Their cloudenveloped summits, though exposed to the rays of the sun in the torrid zone, are covered with eternal snows, and below them the storm is seen to burst, and the exploring traveller hears the thunder roll, and sees the lightnings dart beneath his feet.

Throughout the whole of the range of these extensive mountains, as far as they have been explored, there is a certain boundary, above which the snow never melts, which boundary, in the torrid zone, has been ascertained to be 14,600 feet, or nearly three miles, above the level of the South Sea.

The ascent to the plain of Quito, on which stands Chimborazo, Cotopaxi, Pichincha, &c. is thus described by Don Juan de Ulloa:

"The ruggedness of the road from Taraguaga, leading up the mountain, is not easily described. The declivity is so great, in some parts, that the mules can scarcely keep their footing; and, in others, the acclivity is equally difficult. The trouble of sending people before to mend the road, the pain arising from the many falls and bruises, and

^{*} Pronounced Que-to, the i in all European languages being sounded as an c.

the long conserved and to the state to train in a such income procedure, and temporaries are summated by the sight incomed procedure, and temporaries are state to cont. There are, an error places, to one without a choice any new admires are religious to a visition of the contract and there to the contract at the color, to this structure, then a sight at the color, to the distribution, then a sight and apply a critical of the countries of the land depths, and the contract of the countries of the land depths, and the leave the equalitation, both trains agreed.

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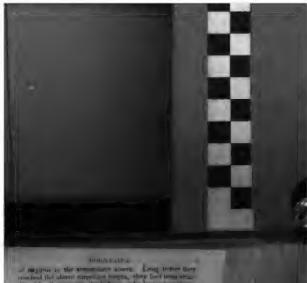


coscined the above surprise on helpfit, they had be doned by their goods, the traffice, who had only a second of their lives. An green were the field of their lives. An green was a second of their lives. anner on their rouge, that they could statedly . - -early salar, and they all coffered deschalls need the erequirement of the cold.

A groun number of Squaresons futurally personned on crowning the vast and shanguanes deserts ordical liss on the declivity of Chimbornae, being now, however, Leter . uniqued with them, such missertours widom occur, ... rially as very few take this route, mobes there he a peace pect of calm and screw westline

COTOPACE

[New Plane, Ale. b.] For mountain is the betteen of those velement - ero Ander which, as recent epochs, have undergone compensaappropriately in the next the Expense, its commets are greeted with personal numer. The absolute height in control is 18,374 inst, as three miles and a balt, correspondity it is 2,522 feet, or built a mile, higher three Vent-- us would be, were that resournin placed on the top of the Peak of Tenewille! Consumer to the most note that one of the volcanous in the bingshop of Chips, and is continuous and the most frequent and disastrines. The most constiworker, and the pieces of rock, thrown out at this valences. cover a metion of several equate becase and a most frame one they be upod together, a productor aparameter. On 17. 5, me Comes at Conservations (196) to a, or represented I half a mer, whose of the same of the sputies. In Course operatings of this enhance where board we the determine of an Income and -. On the ether hand, 12 to, the grant belg or asher the to I at she consisted Company that we wrote that it was dark till these in the anothers. The yaphresum artist new place to 1 11), was presented by the autities explicit to the speeds, which reversed the manifestory has per case, had cover from the case that it a small amile assembly the copy first leavance or to their throat officers a child to real color of the came, heated to a work come prestate thousands approprial milest, and of the dark of on



of suppress in the armonolater above. Long before they conclude the above surprising tempts, they first them with about by that making the that may be about the control of their theorem, who has been called about any or their restore, that they small achieves a the sight of any or their restore, these them small achieves a surprising which willow, and they all authors the satisfactors assigning such they are the state of the control of the collections and the state.

A great number of Spatticeds connectly parented in coording the vast and dangerous deserts which his our the decliving of Chimberses, a long now, however, liveser a quaranted with them, with musico tones weldom carriet, engicially as very live table this mostle, onless there he is presposed of solar and service weather.

COPOPAXI

[See Flats, March] The manutain is the bilines of those enhances of the Lukes which, at recent species, have undergone comprises. Nevertheliumling it lies near the Eigenten, see surquires according covered with perpetinal answer. The absolute lander of owney it is 2,677 test, or built a table, higher than Yasa-on would be, were that nontonen placed on the top of ine P. ak of Tenoritie' Company is the mass market some of the velociness in the himshore of Quite, and its suppressions are the most their past and the case in. The product of carries, and the pieces of read, there we can at this enterior. ence a surface of account equate house. and a most force, one they have been deposited, a printiples, mountains. In 175, the flames of Cutoperal mer. 4800 lost, of uparards this call, about the latest of the cents. B) 1744, the ranking of this relation was found at the discount of the ranking of the discount of the discount of the ranking of the discount of the and it was deed till directly the remaining. The resplication where may place by 1700, who processed to the outlett on their garden and the process of both comments by a process to the second of the comments. Bred. twenty your below, an amount in various died could have property and a word form the property had an a supplier wind!) at our series our may be upon to someway through other or All which is a spaceful, first it in a only a color soly - year agent and all built of the days - one



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Whose the chitale descended, the mercustume found the distributed states of temperary which displant god the market bring down on the attacem country. They are she haptming beang from the clouds, and insert she thursday sail sat beneath them. While the forcer ports were thus breakyed in compactive through and rain, steep unjoyed a delighted second; the wind abund, the sky charad, and the only commor room of the auto quaderated the superire of the public, Page as heart there a laverthe resum, thereto she tould be represented transport to pent stillights - more and half fell continuable, and the wingle commend with each unbrace, that it was improved for so usyrsome the four of being blown down the precipities, or to became begried by the agenticulation of account amore, or by the morning rentiment of rocks which rolled ground them. Every crosses in their has man emproud, and thought the had now small, were exceeded with technologically, and may upol tumps were constantly forming, the earl was at parting that such males atoms was addigned to have a challeng which me coasts. and secretained were complayed every meaning in remove rong the most which had tallog during the abolic. There not mer swedley, and they became to touch t and mountainthat walking was astended with extreme man; I than been in the serve engreed with childrens, and their lige were or widles out chapped, that every motion in speaking hymphy Thurst.

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The topical film fieling above the common region of rapians, the housems, at this electricis, appear with an immend aphendeur. Brydene and tos empranty observed, as they executed in the night, that the number of the state secured to be missively increased, and the light of such one brighter than must. The wholeness of the miles was to make a first year like a gase show which spread are seen the hadron which were thing the same of a turn which were trivially from Leiter. They likewher of atten which were trivially from Leiter. They likewher actived everyed of these mesons called falling states, which supported so much elevated here as when when from the mint temperated we much elevated here as when whose from the mint meants.

This single opportunity contains an epitome of the different climates throughout the world, presenting at our oil the seasons of the year, and all the vaccence of produce. It is recordingly divided into these distinct somes or represent which may be distinguished as the sorth, temperate, and trigist, but which are known by the number of the cultivities region, the weathy or reorganize ergion, and the tright or arent region. The tomor of these extends through engine alles of the avent towards the someth, and is almost me credibly abundant in pastores and iraitance of eyery decription. It is covered with towns, ellipses, and manustresier, and the equation of mindelenter appears over an entitore a estimated of Chipital, In according to the symply setemperature man, the agency changes, it is a new aliquate. a was section. Below, the heat is sufficiently, but bertamater shares, and the girlfs, which themsely specied becomes of here are alcoured into grounds pulling. Then this methods on he was partir agar, the inequality of the and displaybut the aft green ; means to graduate among the self and decreasing character forms of yordays and their the characteristic process of an experimental size. The consequent

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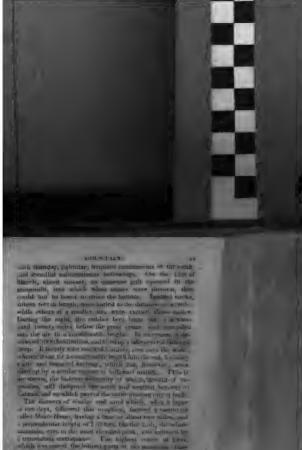
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of the neares 6,000 term and it may be accorded by since different centres, which we all very steep and different from the removal form of the mountain, and the loose rains which slop from make the feet; all the continuous form and the feet and the feet all the continuous of the mountain and the longue to the seconds the distract a net more than three hallous railes. The circumsterence of the patients on the top, in Allium and the feet, and the second of the feet of the place of the patients of the place of

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On approximation the meantain, its report door our entry may improve an of toron, more to it plants, being callivaled for more than two-thinle of its bright, and leaving trabrown top stone barren. There all cordure country; pot, when it appears covered with clouds, which sometimes parampus its mabile only, this circumstance matter with to then deresets from the magnificence of the speciarle Upon the laser which the volcano lung ago ejected, and which like great farmers, extend that the plain, and in the sea, are built brown, villager, and teners. Courteau. rinevards, and cultivated fields, successful those, has a combined of the row, thereby with appreciaments about the future, prince on the socially-than that, because a not in fruttin and so centify, he critices, pardens, and comia aware evaluated up. Protest rate upon thereintagens, a control upon Heatin, and or a fine distance is form-pain in the errors of which, after more flight permitted were relieved bedeaters on communication to the according walks. After a temp interval of regions, in the first weath of the range of Trum. Other weaponty cough on the Christian ora- the refractor emblerity breshe one, e possing think a largely of salars and parenter strates, beneath relabel Harrachteneum. Status, and Pomposi, were completely lay ast. This compstelling to less humanity and here of marines. Exercise 1100 "My there asking of Vestis one, the remainfrance of the time onely such vertice a meline lindy regard. All the conservor the season of the guil of lengths never, on the advises are caam, receiped and distinguit, personalities, and hour tier a best the detirent operand matters been bless than one of the detirent on the process of the detirent of the second operand of deplies, which authorist companies.





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because them, thus lettering one configure holds of the which could not be less theo two miles and a helf or hereafth, and easing a heat to the distance of at least or miles around.

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This emption happened on the tother James at two ofchick at night, and was mannaged by a shoot of an carthquaker, which was doubterly felt at Naples. At the some moment a lemntain or bright less, attempt I write a very blank uniphi and a book report, who seem to resur, and the to a considerable height, from atoms the mutate of the cope of Sensitive. It was breatly encounted by other language, fifteen at which were compact, all as a firmat lane, tending for the space of shoots and court a little decre s and, inspired the north of Headle and Time det Corre The they accord this great operation of nature - your accessors. ated by the forale or thunder, the incommit reported a landa. like chose of a mannerous heavy artiflery, associational of a continued builton purgrain, negative to that of the secure of the second disease a vanhout second. A makene telementer using recentified that his the meeting at a hir or fright or rottens. The langues of Napoles were left assured france to a consume tremoun, the dears and scindings shaking and calling recoveredly, and the lode copping. At the quital numbers me sky, from a higher reliencemy, and star-lages trousers reserved to the spinors accepted to beginning and since annulations of a respective projection for her purpose and promoting and pasteding the atrests, added on the

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Geogle



MOUNTAINS.

prodigiously, covered the whole volcano. In the evening loud explosions were heard; and at Naples a column of fire was seen to rise from the operage, carrying up stones in a state of complete ignition, which fell again into the ceater. The muse by which these igneous explosious were accompanied resembled the roaring of the most dreadful trustiest, and the whistling of the mont furious winds; while the celerity with which the substances were ejected was such, that the first emission had not terminated when it was succeeded by a second. Small monticules were at

this time formed of a fluid matter, resembling a vitreous paste of a rest colour, which slowed from the mouth of the grater; and these became more considerable in proportion as the matter accumulated.

In this state the eguption continued for several days, the are being equally intense, with frequent and dreadful noises. On the 25th, amid these featful symptoms, another aperture, ejecting fire and stones, situated behind the center, was seen from Naples. The burning mass of have which escaped from the crater on the following thay, was distinguished from Torre del Greco, having the appearance of a vitreous fluid, and advancing towards the base of the mountain between the south and south-west. It reached the base on the 30th, having flowed from the aperture, in less than twenty-four hours, a distance of 3,053 feet, while its mean breadth appeared to be about 350, but at the base 860 feet. In its course it divided into four branches, and finally reached a spot called the Guide's Retreat. entire progress to this point was more than a mile, so that, taking a mean proportion, this lava flowed at the rate of eighty-six feet an hour.

At the time of this eruption Kotzebue was at Naples. Vesuvius lay opposite to his window, and when it was dark he could clearly perceive in what manner the masses of fire rolled down the mountain. As long as any glimmering of light remained, that part of the mountain was to be seen, on the declivity of which the lava formed a straight but oblique line. As soon, however, as it was perfectly dark, and the mountain itself had vanished free the eye, it seemed as if a comet with a long tall stood in the sky. The spectacle was awful and grand (

He ascended the mountain on the morning sector

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reaching the ant. realth was artered in healthy great violated abuse, to make the lasting and his tag arrange tion the complet of the agent and one.

Il remains there to happinguing a while differ of the many. rom at 1866 while and any armite indicating thek place on the exercing of the crashet Stay, when a bright threat ross from the minimum in the bearing of about 1866 rest, withing and rating after-andy, and affeeding a close · Poth, that a fetter might have been regulat the despaces it is begin appeared the amountaine. On the bullioning morning, without any exchapative proveding, or but town then their aims contains, positivising to much other, much down told ber ferrer the committee The lace was the mention of Tops out tree and Laune and, arguenting Postby, on the most lenders min Super to Postperti Plane part stor whole or the second of Jense, a miles was theret, recombling that of two grantes acrossed, when the then hange a ref will be by and smooth try and sory by bak. The the name is to easily to their a buildings when went to the their me Instant, speech and that a tomar term it treat there to there; while is proved but it must be. A mee, toose, land ... whatever after the furtherly it are contened up the week, were insoftentile mountly was an dissipanced by our paset where to the mark the remainder of a well, it have at a no Que. In a terr day . Presiet. Re-more and Trans del Como. were married sent called through our by the rate ours and tra-entain, about that they we do not much become about the army whilly at the up pany. Beered immuno, on the above day, decembed along hall way down the ore establic and connection half an happy was a man the theorem. elading the governor prompt of the light have there to it a standard . The implies impression in diguration made great same a and maccomordina is to ed the inner traville their had accounting to the me- are a

MOUNT HECLA,

IN ICELAND.

[See Plate, No. 14.]

Still pressing on beneath Tornea's lake,
And Hecla flaming through a waste of snow,
And farthest Greenland, to the Pole itself,
Where, falling graduel, life at length goes out,
The Muse expands her solitary flight;
And hov'ring o'er the wide stependuous scene,
Beholds new scenes beneath another sky.
Throncd in his palace of cerulean ice,
Here winter holds his unrejoicing court,
And through his airy hall the loud misrule
Of driving tempest is for ever heard;
Here the grim tyrant meditates his wrath;
Here arms his winds with all subduing frost,
Moulds his fierce hail, and treasures up his snows.

On proceeding along the southern coast of Iceland, and at an inconsiderable distance from Skaalholt, this mountain, with its three summits, presents itself to the view. Its height is five thousand feet, or nearly a mile above the level of the sea. It is not a promontory, but lies about four miles inland. It is neither so elevated nor so picturesque as several of the surrounding Icelandic mountains; but has been more noticed than many other volcanoes of an equal extent, partly through the frequency of its eruptions, and partly from its situation, which exposes it to the view of many ships sailing to Greenland and North America. The surrounding territory has been so devastated by these eruptions, that it has been deserted.

Vastregions dreary, bleak, and bare!
There on an icy mountain's height,
Seen only by the Moon's pale light,
Stern Winter rears his giant form,
His robe a mist, his life a storm:
His frown the shiv'ring nations fly,
And, hid for half the year, in smoky caverns lie.

The natives asserted that it was impossible to ascend the mountain, on account of the great number of dangerous bogs, which according to them, are constantly emitting sulphureous flames, and exhaling smeke; while the

were december to the comment of the territories of the court of the court egistering well larger concern, a his fermelymently promped tion and I she would not used the our name present the must applicating events of transport many times, the house prese of the two tarry tenne covered by amounts of material some west, active, out other retention matter (interplication) which, between the objections of the long to discover party. when providing of maintains, wolfs, and hard on by their mast her observed. The deventation is well growing on the good, and early which present described from an electronical the rentative and the habitutions. Serther plants may avera ore to be tout with in the executar two become count the immittante, let consequence of the will heavy envised with money and laver; and its same party where the substraine wie fire los benden out a accusal time, in whose the unities which serie and capitally a remained time arisin his come equation). they fire him views thereof to there; would red and filmet life. lacks and eminerers, from wearing promove strains and The inverse the contrable the hopes and I we like large, and thus are some of them; the commits of which men a cleaning to them, whenever the uniterestance one france onto the manes the approximate there are not become should improved by partial only new the layler in order of live thenwe from the role saw, Rimed the latter to a mountains of hear, countiling at hear towed distance from the or an appears foot buch, and make here of a supplied in wall The on are at interboll, and thirds entered with more while however there or every story holes, or that the arrang on the occurs while expense good emminoperation. The each service and resembly professed to proceed the property of the histograph beyone und from turned on except albertabling from with he come come more for fermion of the interesting to the first the two wated see theren.

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No. 15,-The Geners and Hects.

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Her G. & Blackenson, by his month travels in Trobust. sormand Alexan Herby; and from his account we carried the following turner entire partherhors. In proceeding to the authors retrended of the meaning in descended, by a dangerson path, into a cather, having a small lake in mon country and the appointed extremity bounded by a prepare dicalar lage of each, recombing, in its broken and runged appearance, a stream of lava. While advanting, the our undrients broder through the clouds, and the tailling reth to min of his honors, form different points of the supposed lave, so If from a weekers of place, deligher long traveller by the materiareness conviction that he had mor articled are of the prine qual objects connected with the plan of his experiment to beland. He hastened to the got, and all he wishes were fully accomplished in the communities of so object which greatly exceeded the expectations he had formed. On autending one of the about planneles, which cour and of this extraordinary times of mote, he beliefed a region, the devolution of which can convert he maralleled. Fundament groups of hills, erasors, and lave, leading the eye to distinct anow-renormal particles, (tuberto) mountaines,) the outer claims from a winter-tail; lakes, understained money have block mountains; as well promount allowed towering elouds; our off around of the tarbon report of the most designative of elements; all combined to inspersonline usual with consumous of deeped and wenter. The the more models they were to man their eyes men to point a considerable time clapsed before they could be on them. solves to settend to the landows which had transport them to ante activitible distort of the country.

Having processed a considerable disperse along the subject of a covered flavor a terrory part of which these consent, they grained the four of the surfaced of Mount Backs. While, its narrowling, they had no possessed remped been, they appears to 3 me great difficulty to advancing a labelian they required the great difficulty to advancing a labelian they required with term done, they appear not be required to the great difficulty to advancing a labelian three required with term done, they appear most of the

one step by the yielding of these, a space which had been

gained by several.

Having passed a number of fissures, by leaping across some, and stepping along masses of slags which lav over others, they at length reached the summit of the first neak. The clouds now became so thick, that they began peak. to despair of being able to proceed any further: it was, indeed, dangerous even to move; for the peak consists of a very narrow ridge of slags, not more than two feet broad, having a precipice on each side, several hundred feet in depth. One of these precipices forms the side of a vast hollow, which seems to have been one of the craters. At length the sky cleared a little, and enabled them to discover a ridge below, which seemed to connect the peak they had ascended with the middle or principal one.-They lost no time in availing themselves of this opportunity, and, by balancing themselves like rope-dancers, succeeded in passing along a ridge of slags, so narrow that there was scarcely room for their feet. After a short, but very steep, ascent, they gained the highest part of this celebrated mountain.

Its earliest eruption is said to have happened in 1004, since which time upwards of twenty have occurred. That of 1693 was the most dreadful, and occasioned terrible devastations, the ashes having been thrown over the island in every direction, to the distance of more than one hundred miles. In 1728, a fire broke out among the surrounding lava; and also in that to the west of the volcano, in 1754, which lasted for three days. There has not been any eruption of lava since 1766; but for some years after flames issued from the volcano.

THE GEYSERS.

[See Plate No. 15.]

Nor stops the restless fluid, mounting still, Tho' oft amid th' irriguous vale of springs; But to the mountain courted by the sand, That leads it darkling on in faithful maze, Far from the parent main, it boils again! Fresh into day; and all the glittering hill is bright with spouting sills.

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These relativest intuition, or but operating water springs to be mostly encourant with the operation of satternation. In , or within to every part of behand, now be properly currenced after the description of them. He 25,

They are sufficient every near the rate mure, has one do the devel the whole mandry, and are ever to be found ste the equipment of social of the tree manufacture. The because and your community blood the in the equated to a large field grown elegen willow to the worth of Shullydt. As a event distance from it, on our stife, are high intentant service with leg, and on the ather Herle is over entry above the change, while appendicts to be a stage at make, at the river is which water leaves since on stessy carloss south. As the dissaure of a soile unit a fail a food season more to lineed like that of a lowest precipitated from corporations. mother, mother budges budge and configuration by a bidean authorities Exceptional guidance of the algebraich durapeous time which this region reading histories forms non-restaunt, limit come or results. player between wome thereon in equality the amount. "The Manual procedly Chatern, amounts, than the major process tuple no reasy testione white You Tend outerains to high of pread and more than reals note the later all cohow one, that the jets may be made also much parameters. tipes by the not only percenting enges through in nonmakings, but exercise that the though of this cover great be to be coursing with the water, on taphyrapy the petibles lone of themenon placers. The heat was found by Van Trull bette. two bounds I and swelve departs of Patronius, the hotting point. The sales of the pipe of bein are covered by a over establisher sand, and the water has been format to have a jour type quality. The agenting is porterly consider as Mountles and twen feet, and farmer above, on the earther " the groundly a leaster all youther test in alternate, the one of which I give took chows the wifer or built.

In openhing of the Grynnes, in lost question opinion

Horrebow observes, that if you fill a bottle at one of them, the water it contains will boil three or four times, at the same time with the water in the well. The inhabitants boil their meat in it, by putting the meat in a vessel of cold

water which they place in the hot spring.

Sir G. S. Mackenzie, whose recent travels in Iceland we have already cited, visited the Geysers at a season favourable to his observations, the latter end of July. He found the cultivation of the surrounding territory much higher than might have been inferred from the idea generally entertained of the barren and unproductive state of Iceland. All the flat ground in that quarter of the island was swampy, but not so much so as to impede the progress of the party, who, having passed several hot springs to the eastward of Skalholt, and others rising among the low hills they had left to the right, in proceeding to the great Geyser, came to a farm house, situated on a rising ground in the midst of the bogs. Here the people were busily employed in making hay, a scene which afforded a pleasing change from the dreary solitude they had quitted; the whole of this extensive district, which abounds in grass, would, if drained, our traveller observes, prove a very rich pasture country. Farther on they came to several cottages at the foot of the mountain, round which they turned, and came in sight of the hill, having the Geysers at one of its sides. This hill, in height not more than three hundred feet, is separated from the mountain towards the west, by a narrow slip of flat boggy ground," connected with that which extends over the whole valley. Having crossed this bog, and a small river which ran through it, the party came to a farm house at the east end of the hill, and arrived at a spot where the most wonderful and awful effects of subterraneous heat are exhibited.

On the east-side of the hill there are several banks of clay, from some of which steam rises in different places; and in others there are cavities, in which water boils briskly. In a few of these cavities, the water being mixed with clay, is thick and varies in colour; but is chiefly red and grey. Below these banks there is a gentle and uniform slope, composed of matter which, at some distant period, has been deposited by springs which no longer exist. The strata or beds thus formed, seemed to have been broken

by shorter of mathingular, particularly man the great manufacture methods are not in the old themetalling town which highly governous some tome, with allowing denice. of lange. At the northern extremity to stronged the great George authorizing distinguishable from the others by avery circumsones comerned with it. On approviding the agent to appreciated their ofmousin had been more of the galacthe arrens of which that hours studies. The clope of the tarter less record the mount to fravoid more on the care ride; and the ment depositions of the natural may on the and till they calmed with them. The perpendicular beight of the about a ser test, meanied from the lightest part of the outree of the old depositions. I'mm the wither mitter composing the mater may be couldly detuned deed, on the west only where a discingular has taken place. The the vap of this mount is a basing whole was cannite retrial fitty sie and in one deportung and hory - a

At a quarter betwee three sections in the attenues in which the party resolved the great, they beand the backs trial at the same, a light of which are remoting over. Having extends their carriers at that many they presented to examination after places, whomse days say water as emiliar.— Notes they great targets, it is described at which, the writer of some they are the operating, the beauties of which, the writer of some that two filled states a less as expected, and presently still, eitherway in the beauties of which, and presently still, either the contrained forming point. Through they say white increations forming a trial of them, and carrying the extension of a trial, also as a contrained a discount of an increasing them materials about a supporting them materials a discount at the contrained and are of an increasing that the contrained and the literature of the supporting them.

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friends. The water in the basin was greatly agitated, and flowed over, but there was not any jet. The same occurred at half past two. At five minutes past four on Saturday morning, an alarm was given by one of the company. As our traveller lay next the door of the tent, he instantly drew aside the canvass, when at the distance of little more than fifty yards, a most extraordinary and magnificent appearance presented itself. From a place they had not before noticed, they saw water thrown up, and steam issuing with a tremenduous noise. There was little water; but the force with which the steam escaped, produced a white column of spray and vapour, at least sixty feet high. They enjoyed this astonishing and beautiful sight until seven

o'clock, when it gradually disappeared.

The remaining part of the morning was occupied in examining the environs of the Geysers; and at every step they received some new gratification. Following the channel which had been formed by the water escaping from the great basin during the eruptions, they found several beau-tiful and delicate petrifactions. The leaves of birch and willow were seen converted into white stone, and in the most perfect state of preservation, every minute fibre being entire. Grass and rushes were in the same state, and also masses of peat. Several of these rare and elegant specimens were brought safely to Great Britain. On the outside of the mount of the Geyser, the depositions, owing to the splashing of the water, are rough and have been justly compared to the heads of cauliflowers. They are of a vellowish brown colour, and are arranged around the mount. somewhat like a circular flight of steps. The inside of the basin is comparatively smooth; and the matter forming it is more compact and dense than the exterior crust; when polished it is not devoid of beauty, being of a grey colour. mottled with black and white spots and streaks. white incrustation formed by the water of the beautiful cavity before described, had taken a very curious form at the water's edge, very much resembling the capital of a Gothic column.

THE SULPHUR MOUNTAIN.

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As the land of the mountain to a until look, company deaths to easy providents, and other easy providents of their ateunt reness. Having an embed this book, a ridge premust storify immediately to quotion which to a deep bottom. whence a production of capour priors, with a continent name of hading and sphuldos, accompanied by an an energing total anyone convices in the girl. This hallow hither, as well so the while side of the mountain appears, consucial with sulphin and class, it was very basacilias to walk 1989. is creft count armanumy surfaces of care has been excellent. The vapour come calmy the party from early other corrected. mind amounter on, and there was worse to exect in the course of sulphur brooking, or of the clay such our law on the They were thus everal three in danger to be up and ded, as indeed, longround to one of the party. Mr. thereto, who modificatelly planted one or his less one the him iday. When the floremone by wer immuss i in the tethe eligable of a down numbers, it groupedly show the without his degrees of the leading point. By depring common by and granting were little link term Chieft steam conver, there some antertains of how the they no det vention. Then good morany happener We George always, maybe and to tronge my or in the reasons this weathers place, without being personal with two seconds, with which waves port of the lambs may be received in perfect salery. At the betters of the hollow, almos doe tiled, they harm the caulifrence and, and to his all the annual vehicular. They appropriate of writing about process of it, the whole townships their to the ame exist part of this consider openment again to command our entires, about aftern through age to the Books of or of attitutions. Permit this spin was an few entire. open tilled with ware mailing landly. As the control is

hill, in a hollow formed by a bank of clay and sulphur. steam rushed with great force and noise from among the

loose fragments of rock.

In ascending the mountain, our travellers met with a spring of cold water, which was little to be expected in such a place. At a greater elevation, they came to a ridge, composed entirely of sulphur and clay, joining two summits of the mountain. The smooth crust of sulphur was beautifully chrystallized; and beneath it was a quantity of loose granular sulphur, which appeared to be collecting and chrystalizing, as it was sublined along with the steam. On removing the sulphureous crust, steam issued, and annoyed the party so much, that they could not examine this place to any depth.

Beneath the ridge, on the farther side of this great bedof sulphur, an abundance of vapour escaped with a loud noise. Having crossed to the side of the mountain opposite, they walked to what is called the principal spring. This was a task of much apparent danger, as the side of the mountain to the extent of about half a mile, was covered with loose clay, into which the feet of our travellers sunk at every step. In many places there was a thin crust, beneath which the clay was wet, and extremely hot. Good fortune attended them; and without any serious inconvenience, they reached the object they had in view. A dense column of steam, mixed with a small portion of water, forced its way impetuously through a crevice in a rock, at the head of a narrow valley, or break in the mountain. The violence with which it rushed out was so great, that the noise, thus occasioned, might often be heard at the distance of several miles. During night while the party lay in their tent at Krisuvik, they more than once listened to it with mingled awe and astonishment. Behind the column of vapour was a dark-coloured rock, which added to the sublimity of the effect.

"It is quite beyond my power," observes Sir George Mackenzie, "to offer such a description of this extraordinary place, as would convey adequate ideas of its wonders. or of its terrors. The sensations of a person, even of firm nerves, standing on a support which feebly sustains him, over an abyss where, literally, fire and brimstone are in dreadful and incessant action; having before his eyes tre-



acondone provide it when is more as how will like a construcpay in the boupouts, his care admin'd with flound they rink. on a most be experienced before they can be understand."

MONTH III, ANG.

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ingly swelled.

On the first of August of the following year, 1787, the celebrated and indefatigable naturalist, M. de Saussure, set out on his successful expedition, accompanied by a servant and eighteen guides, who carried a tent and mattresses, together with the necessary accommodations and various instruments of experimental philosophy. The first, night they passed under the tent, on the summit of the mountain of La Cote, 4986 feet above "the Priory," a large village in the vale of Chamouni, the journey thither being exempt from trouble or danger, as the ascent is always over turf, or on the solid rock; but above this place it is wholly over ice or snows.

Early next morning they traversed the Glacier of La Cote, to gain the foot of a small chain of rocks, inclosed in the snows of Mont Blanc. The glacier is both difficult and dangerous, being intersected by wide, deep, irregular chasms, which frequently can be passed only by three bridges of snow, which are suspended over the abyss. After reaching the ridge of rocks, the tract winds along a hollow, or valley, filled with snow, which extends north and south to the foot of the highest summit, and is divided at intervals by enormous crevices. These shew the snow to be disposed in horizontal beds, each of which answers to a year, and notwithstanding the width of the fissures, the depth can in no part be measured. At four in the afternoon, the party reached the second of the three great platforms of snow they had to traverse, and here they encamped at the height of 9312 feet above the Priory, or 12,768 feet, nearly two miles and a half above the level of the sea.

From the centre of this platform, enclosed between the farthest summit of Mont Blanc on the south, its high steps, or terraces, on the east, and the Dome de Goute on the west, nothing but snow appears. It is quite pure, of a dazzling whiteness, and on the high summits presents a singular contrast with the sky, which in these elevated regions is almost black. Here no living being is to be seen; no appearance of vegetation; it is the abode of cold and silence. "When," observes M. de Saussere, "I represent to myself Dr. Paccard and James Balma first

entering, and the destine at they, in these descent, without shelter, without constaure, and even without the entering that their proposes in their time, and still put who they places with their proposes in the first, and still put who they are north make any materiality. It were impossible to others two reach these strength of rather and the known of

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the smallest difference in the taste or smell of bread, wine, meat, fruits, or liquors, as some travellers have pretended is the case at great heights; but sounds were of course much weakened, from the want of objects of reflection. Of all the organs, that of respiration was most affected, the pulse of one of the guides beating ninety-eight times in a minute, that of the servant one hundred and twelve, and that of M. de Saussure one hundred and one; while at Chamouni the pulsations respectively were forty-nine, sixty, and seventy-two. A few days afterwards, Mr. Beaufoy, an English gentleman, succeeded in a similar attempt, although it was attended with greater difficulty, arising from enlargements in the chasms in the ice.

THE GLACIERS, OR ICE MASSES.

[See Plate, No. 17.]

THE three great Glaciers, or Ice mountains, which descend from the flanks of Mont Blanc, add their ice to that of the Miage, and present a majestic spectacle, amid the astonishing succession of icy summits, of deep vallies, and of wide chasms, which have become channels for the innumerable torrents and cataracts with which these mountains abound. The view which the Glacier of Talafre affords from its centre, looking towards the north, is as extraordinary as beautiful. It rises gradually to the base of a semicircular girdle, formed of peaks of granite of a great height, and terminating in sharp summits, extremely varied in their forms; while the intervals between these peaks are filled up by ice, which falls into this mass, and this mass of ice is crowned by masses of snow, rising in festoons between the black and vertical tables of granite, the steepness of which does not allow them to remain. A ridge of shattered wrecks divides this glacier lengthwise, and forms its most elevated part, being 8538 feet, upwards of a mile and a half, above the level of the sea. This prospect has nothing in common with what is seen in other parts of The immense masses of ice, surrounded and surmounted by pyramidal rocks, still more enormous in magnitude; the contrast between the whiteness of the snow and the obscure colours of the stones, moistened by the water which trickles down their sides; the purity of the air; the dazzling light of the sun, which gives to these aligned a characteristic with the property and adjusted a solution of the control of the color o

The planter of Winder is covered with the purely of our other recommuters, which tell some years ego, and finded course has, the hand absorber to recent to rune.

VIDW PRIM THE BURT

thereas an take our lines of Mont Blane and of the Afric. the meaboutly hilliand sien from the annual of the Buer such the be noticed. Soon, any M. Bourdy, did perspect appear in you Timonto the was the Blame to come sensitive are the space of thirty at leagues through the elebplants or the Values, the quete of the store which the memptales cave with their about coming tike threads of while thereing the group and the rack planes, the stone of to ado to the libeling namentalise at Swarzantanet, At Conthurd, and the Gramma all governs with her; while me the good, the heights and authority, train many is the fairl or elevastore on the glober to bear plants sembed by the arm. Or nosa come like a spot as our mul at the lake, and the lake smult tran a anemora larged, divising the fields which it was County and they made a the mountains of while be dimental by solution ing organish memberings, then the eye box with co conver nor entere of sight to embrace the while of the The rie threated in its vive. And the leaded names of the presence a schools descend on varya and , while is a past of tier milians at tail the little princess, years will the tie emilian and 100, and the achieve on exacts of the Alpe, their placers and anjuring emitted, and, along all, the months our briefe

of Mont Blanc, that enormous colossus of snow and ice, which parts the clouds, and pierces to the very heavens! Below this mountain, which bids defiance to time, and whose eternal ice disregards the dissolving power of the sun, a band of pyramidical rocks appears, the intervals between them being so many vallies of ice, the immensity of which appals the imagination. Their deep chasms may be distinguished, and the noise of the frequent avalanches (falls of immense masses of snow,) presents to the mind the gloomy ideas of horror, devastation, and ruin. Fagher on, other summits of ice prolong this majestic picture.—Among these are the high mountains of the St. Bernard, and those which border on the Boromean islands.

Perhaps there is not in our hemisphere a theatre more instructive, or more adapted for reflection, than the summit of this mountain. Where beside can be seen such variety and contrast of forms; such results of the efforts of time; such effects of all the climates, and of all the seasons? At one glance may be embraced frosts equally intense with those of Lapland, and the rich and delightful frontiers of Italy; eternal ice, and waving harvests; all the chilling horrors of winter, and the luxuriant vegitation of summer; eighty leagues of fertile plains, covered with towns, with fields, and herds, and adjoining to these, a depth of twenty thousand feet of everlasting ice.

MONTSERRAT.

[See Plate, No. 18.]

Here, 'midst the changeful scenery, ever new,
Fancy a thousand wond'rous forms descries,
More wildly great than ever pencil drew;
Rocks, torrents, gulfs, and shapes of giant size,
And glittering cliffs on cliffs, and fiery ramparts rise.

BEATTIE.

This Spanish mountain, which has been so long celebrated on account of the singularity of its shape, but chiefly for its convent and its numerous hermitages, is nine leagues north-west of Barcelona, in the province of Catalonia. It is in height only 3,300 feet abo the level of the sea, but it commands an enchanting prospect of the fine plain of Barcelona, extending to the sea, as well as of the Islands of Majorca and Minorca, distant 150 miles.

and which mand in the converg much is placed to a the lead of the small of the court water as a small state to the the rank presents perputation to the train the court the the entre of the course, when it forms the mount for entre of the turns, which and examine be, absorbed and bear, and gehr interplaine, organo, and other changes oneper, and a pour positive operation. There are most language or introduction. assence, which are a corp. I was alithered pulate of the attained a pour of thing on the says praymen, is the crosses, in which they come to grow, other others are placed in enduce hower one at the lattices pyramids. The highest Mr. Abadibaleur, the elected times which is between two some by a Richa of surpo, called Jacob a leadure feating into a sealing with tremos above the connect of the amore name. The comes are force to the most great-saper shapers the applied it may being named to the Origin, I bear its to amplement in number of phone

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cisterns; an inconvenience, however, which is in a great measure counterbalanced by the absence of wolves, bears,

and other wild beasts.

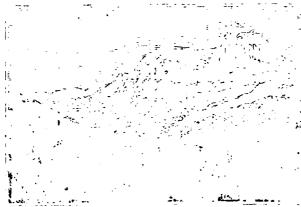
Captain Carlton, an Englishman, who visited Monserrat some years ago, ascended to the loftiest hermitage, that of St. Jerome, by the means of spiral steps hewn out in the rock on account of the steep aclivity. This, he observes sould not, in his time be well accomplished by a stranger, without following the footsteps of an old ass, who carried from the convent a daily supply of food to the hermits. This mimal having his two panniers stored with the provisions divided into portions, climbed without a guide, and having stopped at each of the cells, where the hermit took the portion allotted to him, returned back to the convent. He found that one of these hermits, to beguile the wearisomeness of his solitude, had contrived so effectually to tame the birds which frequented the groves surrounding his hermitage, that he could draw them together with a whistle, when they perched on his head, breast, and shoulders. taking the food from his mouth.

The convent is situated on the eastern side of the mountain, which seems to have been split by vast torrents of water, or by some violent convulsion of nature: in this way a platform has been formed in the cleft, sufficiently ample for the purpose of its construction. It is one of the forty-five religious holises of the Spanish congregation of the order of St. Benedict. The monks are bound to supply food and lodging for three days to all pilgrims who come up to pay their homage to the Virgin; besides which, they entertain the hermits on Sundays. The latter, who make a vow never to quit the mountain, take their stations by seniority, the junior hermit being placed at the greatest distance from the convent, and descending progressively as the vacancies happen. They are not altogether idle, taking pains to rival each other in making basket-works and other fanciful productions, which they display with great affability to their visitors. They assemble every morning to hear mass and perform divine service, in the parishchurch of St. Cecilia, which lies considerably above the convent; and twice a week they confess and communicate. They wear their beards long, and are clad in brown.

The church of St. Cecilia is a gloomy edifice, the gilding









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THE PEAK OF TENERIPPE

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The stream of the Peak of Temple's are entired without and according to the remains and the according to the last of the season, is a light to season, the last of the season and the peak of the season, the last of the season are entire than the distribution. A contagon the peak of the last of the peak of the last of the peak of the last of the season, and present a treat plants of translate of the season. The season in a season the season the season in the Meanman of Present which are said to have connectly greater these in great advantages and the rest of the peak of the season the season that the season is a season of the season the season

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than seven thousand feet, nearly a mile and a half, above the level of the sea; and here the currents of lava, hitherto concealed by the vegetation, begin to appear in all their aridity and confusion, a few lowly shrubs and creeping plants alone diversifying the surface of a desert, the most

arid and rugged that can be imagined.

A small sandy platform of pumice stones, bordered by two enormous currents of vitreous lave, and blocks of the same nature, ranged in a semicircle, forms what is called the Station of the English, on account of the Peak having been so often visited by British travellers. This platform is 9,786 feet, upwards of a mile and three quarters, above the level of the sea; and beyond it the acclivity is very steep, great masses of scoriæ, extremely rough and sharp, covering the currents of lava. Towards the summit, nothing but pumice stone is to be seen. In fact the peak can only be ascended on the east and south-east sides. As it is impossible to get round the crater, the traveller's progress is arrested at the spot at which he reaches it. Here the two orders of volcanic substances are to be seen, the modern lavas being thrown up amid the ruins of ejections much more ancient, the immense masses of which constitute the platform on which the Peak is placed. The shattered sides present a series of thick beds, almost all plunging towards the sea, composed alternately of ushes, volcanic sand, pumice stones, lavas, either compact or porous, and scoriæ. An incalculable number of currents, comparatively recent, which have descended from the Peak, or have issued from its flanks, form irregular furrows, which run along the more ancient masses, and lose themselves in the sea to the west and north. Among these currents more than eighty craters are scattered, and augment with their ruins the confusion which prevails throughout.

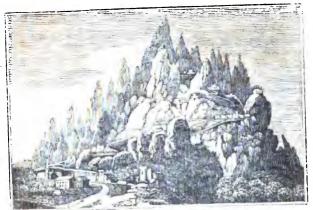
The crater can alone be reached by descending down three chasms. Its sides are absolutely precipitous within, and are most elevated towards the north. Its form is elliptical; its circumference about one thousand two hundred feet; and its depth according to Cordier, one hundred and ten feet. Humboldt, however, estimates it at not more than from forty to sixty feet. The sides are, agreeably to the former of these observers, formed of an earth of snowy whiteness, resulting from the decomposition of the blackest

and have a vite an perpiny the large. All the set we take note the lowest pasts or appeal by blocks, which have taken therefore the other. The could partition enver a sub-obtains the vertical of outplant, of a chemical belief and the course of which are easily an timb been the plant of the yet known, in the form at attention of anisotropic form an attention of accounts which preserves a very turns of his interest of formation and the formation of autplant and vertex, perfectly imaged. Provide the formation of autplant, apach, in this plants, by termined with a constation of autplant, apach, in this plants, by termined with a constation of autplant, apach, in this plants, by termined with an autonomous bosoille mountains, besting upon a characteristic and and are accordance contents.

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No. 18 .- Montserat.



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At the distance of thirty-four leagues from the island, Mr. Bennet had a very distinct view of the Peak, rising like a cone from the bed of the ocean. The rocks and strata of Teneriffe, he observes, are wholly volcanic, the long chain of mountains, which may be termed the central chain, traversing the island from the foot of the second region of the Peak, and sloping down on the eastern, western, and northern sides, to the sea. Towards the south, or more properly the S. S. W. the mountains are nearly perpendicular, and though broken into ridges, and occasionally separated by deep ravines, that are cut transversely as well as longitudinally, there are none of those plains, nor that gradual declination of strafa, which the south-eastern and north-western sides of the island exhibit.

Mr. Bennet ascended the Peak in the month of September, 1810. We give the abridged details of this ex-

pudition in his own words.

The road to the city of Orotava, is a gradual and vasy slope for three or four miles, through a highly cultivated country. Leaving the town, after a steep ascent of about an hour, through a deep ravine, we quitted the cultivated part, and entered into forests of chesnuts, the trees of which are of a large size. The form of this forest is oplong; the soil is deep, and formed of decomposed lava. s.r ill ash and pumice. I examined several channels in the strata, or ravines worn by the rains, and there was no appearance of any other rock. Leaving this forest, the tract passes over a series of green hills, which we traversed in about two hours, and at last halted to water our mules at a spot where there is a small spring of bad and brackish water issuing from a lava rock. The rayine is of considerable depth. The range of green hills extending a mile or two further, the soil shallowing by degrees, until at length, the trees and shrubs gradually dwindling in size, the Spanish broom alone covers the ground. Leaving behind us this range of green hills, the track, still ascending, leads for several hours across a steep and difficult mass of lava rock. broken here and there into strange and fantastic forms, worn into deep ravines, and scantly covered in places by a thin layer of yellow pamice. As we proceeded on our road, the hills on our left gradually rose in height till the summits were lost in those of the central chain; while, on our right,

we were regardly growing and or artime amove the house prome no the Prak. We must engineered equal common hills, or weather in artifies volcounce, the decemper of by, on, the supposed the emicro has two a structure of militaries state of tempth, an impoure unauter of plane operate to If the o fine as all rains, posits in far an ile on a margarish. The plane is bounded as the west and have and must mention or, by many or our our personal many programs and missing they many tengen , in championisse, eather by the Gambarts Luc-Cables. In the idea, or design for as been legged to post done of vogetation except a marchanted player of Spanish through, a or matthe change pros left in the atminisher . Her wind was tory and above, and the ellipses the ipar or Phodosular the markin of Amagan. All large was sail. others aged sellingly. Will saw as a ellectronic the forcelo places. in this came, bring as it more united may bed, and allowation state that internst to show order of association with which we never appropriated, we were pleased person or world Parsonal on I show the level of the and, and best rear find be higher of the arriver of graph of the Part.

The in reached the end at the pistu, we sound invertiis the learning of a streng hill, or the time at which to a manor exercised days. Alles a laboration, and to my learned an ment of alicen on lines, the parents and an even may, and the unifer anking know the plat weary are a me ar arm at should be un the alternoon of the other expression of the shows of large, which, discrepting from the absorbed of the arrange conjugate the Prof , distributed the resident for companion more developments, the oper morning in the mind on the last the where is the participant to make here me were in some the night to an ill tiring a fire mark of the harmides of the Fromthe took, we make where and last spreakers describe it I have say a great three bear putes on the newton by the live, the go after many portions sold. As I somet by the for, the as were assumed all The Post and the opposition clare we that we to me tall, more a cortable mean and is the duty a first another was not be and of the said

such a height in the morning, and had cost us a day's labour to climb, lay stretched as plains at our feet; from the uncommon rarity of the atmosphere, the whole vault of heaven appeared studded with innumerable stars, while the valleys of Orotava were hidden from our view by a thin veil of light fleecy clouds, that floated far beneath the elevated spot we had chosen for our resting-place; the solemn stillness of the night was only interrupted by the crackling of the fire round which we stood, and by the whistling of the wind, which coming in hollow gusts from the mountain, resembled the roar of distant cannon.

Between two and three in the morning we resumed, on foot, our ascent of the mountain, the lower part of which we had climbed on horseback the preceding evening; the ascent, however, became much more rapid and difficult, our feet sinking deep in the ashes at every step. From the uncommon sharpness of the acclivity, we were obliged to stop often to take breath; after several halts, we at last reached the head of the pumice hill. After resting some short time here, we began to climb the stream of lava, stepping from mass to mass. The ascent is steep, painful, and hazardous; in some places the stream of lava is heaped up in dykes or embankments; and we were obliged to

clamber over them as one ascends a steep wall.

We halted several times during the ascent, and at last reached a spot called La Cueva, one of the numerous caves that are found on the sides of the mountain; this is the largest of them, and is filled with snow and the most delicious water, which was just at the point of congelation. The descent into it is difficult, it being thirty or forty, feet deep. One of our party let himself down by a rope: he could not see the extent of the cave, but the guides declared it to be three hundred feet in length, and to contain thirty or forty feet of water in depth. The roof and sides are composed of a fine stalactitic lava, similar to that found on Vesuvius, and it is of the same nature as that We rested here about half which flowed on the surface. an hour, during which we had an opportunity of observing the rising of the sun, and that singular and rapid change of night into day, the consequence of an almost entire absence of twilight. As we ascended the north-east side of the mountain, this view was strikingly beautiful: at

force there appropriate a largety are all and one the landings. which weathout, operationall ligarities up the houses by can discount the an employed by the head of the entire territations as the the mountain of Courtilly and there of the great Care there a site a climit than the included distingly to the conference tay sported one seen map. The great Courts was comity to In the lagrandical and in range I and membranes depicted, conductor than so the infancial contents are so that in the same had eye. The weld at this there was intrans, the shad know and attended and the the community work to 12 dayses. After a short through a good second, we re added the encenttof the account of the its property parameters in a small phiere of selecte purples, of which feets govern proton of layer and as learn agreed as the tops of the come. This distance in the mountain forces is less to provenilly terms fally Proof of Trace (if a management the present restor of Am. make, wall this difference, have ever that while the enthe cut that amountain is a man much at the best citative on only the experimentally uppears to be a depend on pumber of in white restings, at a circum wall layer will bear and there rouse childred de meses that were probably this are and when the with the coultries there can come a mind on the court was the and of the monday made a vagor with reminerable heat the longer line and tallgains past of the seven. The abequies of the frame is a conservation could be possible. early later the oals, and large is once at parameter and large resident effects begins above to the tweet all barrier I, and our hang and have non-ore, they more marrially lains; in long to ally alight all me endiagnost in the company the high angles of the high cot plate of the monatone. This uppermiss is but the and appear to contain to superfuses made their arms and a limbs and is well a small reduce, the walls of which are the states on a mark on the second of the plants of the bound bedrow. Whilehe, the large to be the present could state is the approximation. The curtain is has no this news, must the cultive out it was appropriate to common later in more epitt, no at their among on the arms to our house to the free deposit of suppley; upon surface the young with the less the would be bother souther to want to groute out the the mane torpulsant in the course of Translin, and halforen . I truspeggie also streetly set they conser to be, come this begins

ridge to the bottom, about two hundred feet, forming an

easy and gradual descent.

The view from the summit is stupendous: we could plainly discover the whole form of the island, and we made out distinctly three or four of the islands, which, collectively, are called the Canaries; we could not, however see, Lancerotte or Fuerteventura, though we were told that

other travellers had distinguished them all.

From this spot, the central chain of mountains that runs from south-west to north-east, is easily to be distinguished. These, with the succession of fertile and woody vallies. commencing from San Ursula, and ending at Las Horcas, with the long line of precipitous lava rocks that lay on the right of our ascent, and which traverse that part of the island running from east to west, from their point of departure at the Canales to where they end in an abrupt headland on the coast, with their forests, and villages, and vinewards, the port with the shipping in the roads, the towns of Orotava with their spires glittering as the morning sun burst upon them, afford a cheerful contrast to the streams of lava, the mounds of ash and pumice, and the sulphurated rock on which we had taken our seat. The sensation of extreme height was in fact one of the most extraordinary I ever felt; and though I did not find the pain in my chest arising from the rarity of the atmosphere, near so acute as on the mountains of Switzerland, yet there was a keenness in the air, independent of the cold, that created no small uneasiness in the lungs. The respiration became short and quick, and repeated halts were found necessary. The idea also of extreme height was to me more determinate and precise than on the mountains of Switzerland; and though the immediate objects of vision were not so numerous, yet as the ascent is more rapid, the declivity sharper, and there is here no mountain like Mont Blanc towering above you, the 12,000 feet above the level of the sea appeared considerably more than a similar elevation above the lake of Geneva. We remained at the summit about three quarters of an hour, our ascent having cost us the labour of four hours, as we left the Estancia at ten minutes before three, and reached the top of the peak before seven. Our thermometer, which was graduated to the scale of Fahrenheit, was, during our ascent, as follows:

in Clemana, as ought to the morning, Table at his in the average, at his Fatoman, Sale, at one, in the following marmay, ever at La Cover, at bult great four, 300%, 5 the lasting of the count, 56"; at the top of the peak, we bour and a half after marian, arm. The descont down the core is difficult from its extreme mobility, and from the tall of large cours, which haven should be from the hade of primiter. Making at last arrandoled to the following we page and one marsh down the miles wares of the lave, that he to my almost to meeterly and, howing meanited the motors The current and everts in this service at him are always and the middle of the descent late them is always painted and troublissome, utun dan croins, in come places are les cares solves dono from reck to rock. I can form no opinhar why there abouted by those errors to the subscribe to the suntors of the large in phase it resembles other enhancement the trough of the way and I was compare to be nothing but so if the control of the leaf by some forces or one stubles stationary, the waves committing three swell. As we again appreciation for Charme, we mean to a steventing stage valley, the depth of which, from its two colon, cannot be have them were hundred to upo buildred and fifty from the has a lying to broken chieve one open the other, couldn't in the marrie of grande i at that more and drive have engelikest itasen from the log of the Alpa camil, everyo from the services we what Allton valle "the Piers Sugar " clear the time designation to at the mounts of fracting stable it as a discount

We descended the pounce till with great regular at most of a row and national at La Unions in little group than the found. We that incontrol our rails, and following the part to be printed to be proved in the printed as a reservoir, about our related, the quarter language of any

Incomeditors, rul Mr. Harry

Then their exequipment which between to once the time to account, we appeal on the 24th of Principles, 17th which taken the interest principles with a confuguetion with the control probe. The the 14st 1 great light are planted to the Mary, tensored the white control one Peter the opening of opening a stability with the control of the

ty fires in the vicinity. The whole country for three leagues round was in flames, which were increased by another volcano opening by at least thirty different vents within the circumference of half a mile. On the 2nd of February following, another volcano broke out in the town of Guimar, swallowing up a large church.

A subsequent eruption in 1706 filled up the port of The lava, in its descent, ran five leagues in Guarachico. six hours; and on this lava houses are now built where ships formerly rode at anchor. Neither of these eruptions were from the crater on the summit of the peak, for that has not ejected lava for centuries, and it now issues from the flanks only. The last cruption was on the 9th of June. 1798, and was very terrible. Three new mouths opened at the height of 8,130 feet, upwards of a mile and a half above the level of the sea, upon the inclined slope of the base of the Peak towards the S. W. Above this, at the height of 10,240 feet, nearly two miles, M. Cordier found a vast crater nearly four miles and a half in circumference. which he ascertained to be very ancient. Its sides are extremely steep, and it still presents the most frightful pioture of the violence of subterraneous fire. The Peak rises from the sides of this monstrous aperture. To the S. W. is the mountain of Cahora, which is said to have become a volcano in 1797. The other mountains of Tenerisse, which tradition reports to have been formerly volcanoes, are Monte Roxo, or the red mountain; several mountains, called the Malpasses, lying to the eastward; and one, (Rejada) in a southern direction. Throughout the whole of the thistance between Monte Roxo and the bay of Adexe, according to Mr. Glass, the shore is about 2500 feet, nearly half a mile, in height, and perpendicular as a wall. The southern coast has a much superior elevation, the chain of mountains by which it is bounded being, agreeably to St. Vincent, 8,320 feet, more than a mile and a half, above the level of the sea.

THE SOUFFRIERE MOUNTAIN, IN THE ISLAND OF ST. VINCENT.

This volcanic mountain, the dreadful eruption of which we are about to describe, is the most elevated and most

martheely at the fedry chain country through the West factor Island of St. Smooth. From the entraunthiary frequency and statemen of the continuous, who have the trace cate. total to have expended too bouched, are a great proper nearly or exception was harked for. In the investme the assemble. lodicated much disquiender has the apprehension on our en lappenilation to restanta carlosary, or to persons especies Visite to the case, which had betterly liven more immercial thing came. Seven on the While at April, 1813, the day giveconting the manufacture, we real gentlement and continue on the state of the continue of the c matural there by anne time. Southing marginal was there expension, nor mer value and all the more change of many eather a displant comment of wheat term the nativatives of the carried light, at the bottom of the crosser. To those a botrage put scatted this recently and mounterful sport a derte the singles of H, as It laidly are oil, to problemly recomment

4 Alenn 3(9)) from from the level of the one, on the marie alde of the mountain, and at rather more than two there at the helpers, opinion a observation channel come when a secondary half o make in discounter, and have one 100 and 360 lent is a single of till influence they are significantly and almost grate in all more real, exclude more real and a more and a rule abundanhouseless and, and some, also a half was on, and the evenue the covered over with angus outdoor to the true brane the Magere of the appropriate interesting on the rendia, a start white same or was annountly matterly recommender time at write a eligible librarie. The prosequence was one there magnific at marginification were free and with engines were enough pour by execute gaining diamone land more entering the the startly and onthe or the base of the runt were two phone in ways, title purplinely pains into that he the wine amount improvement with salphus mus clone. This lastly and bestdant past & ... carde to I more substitute of the o upper militality and all me that their our

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to the tropical tempest. It apparently slumbered in primeyal solitude and tranquility, and, from the luxuriant vegetation and growth of the forest, which covered its side from the base nearly to the summit, seemed to discountenance the fact, and falsify the records of the ascient volcano. Such was the majestic, peaceful Souffriere, on April the 27th; but our imaginary safety was soon to be confounded by the sudden danger of devastation. Just as the plantation bell rang at noon on that day, an abrupt and dreadful crash from the mountain, with a severe concussion of the earth, and tremulous noise in the air, alarmed all around it. The resurrection of this fiery furnace was proclaimed in a moment by a vast column of thick, black, ropy smoke, like that of an immense glass-house, bursting forth at once, and mounting to the sky; showering down sand, gritty calcined particles of earth and ashes mixed, on all below. This, driven before the wind towards Wallibou and Morne Ronde, darkened the air like a cataract of rain, and covered the ridges, woods, and case-pieces with light greycoloured ashes, resembling snow when slightly covered by dust. As the eruption increased, this continual shower expanded, destroying every appearance of vegetation. night a very considerable degree of ignition was observed on the lips of the crater; but it is not asserted that there was as yet any visible ascension of flame. The same awful scene presented itself on the following day; the fall of ashes and calcined pebbles still increasing, and the compact, pitchy column from the crater rising perpendicularly to an immense height, with a noise at intervals like the muttering of distant thunder.

On Wednesday, the 29th, all these menacing symptoms of horror and combustion still gathered more thick and terrific for miles around the dismal and half-observed mountain. The prodigious column shot up with quicker motion, dilating as it rose like a balloon. The sun appeared in total eclipse, and shed a meridian of twilight over us, that aggravated the wintry gloom of the scene, now completely powdered over with falling particles. It was evident that the crisis was yet to come—that the burning fluid was struggling for a vent, and labouring to throw off the superincumbent strata and obstructions, which suppressed its torrent. At night, it was manifest that it had greatly disengaged itself from its

families, by the approvates of the families above the same

the the minumble with at April, the reflection of the the comment public and the limit of the property of the property of time beyond implement any comparison of the Charters. in al the Andre our line Arthre minery and the at the flavor openions and brillians of the said granter of facilities glad and wreathed enubrant should. It alterwants were med a more sulphurs no cost, like what are solted thumber character most in the common of the day had a legislythman and cannable appearance, with a meet liveless action to the ancont, and a single extension oblitation, At If almost front none aport electronica. In the electrone, the color one torquery, and membed the approach of thurster will arrange and marrer, with a vibration that affected the first. ongo and bearings on yet there were no convolute motion, or mentile methquake. The Chresita cutted at Morn-Burnets, or the man of the though man, alcockwood that home with their live and, and every thing they present, and It if pre untarry toward terms. The magning to come comtition, because their works, looked are better mountain, and, an it almost, married of, with the elect of what show entitle neither midreanid at describe the binds bill to the ground averguenced wills absure of makes, muchly in her the pe slove in the wlay -the cattle wave discount for want tionle on test is black out private on a lead was some for he found —the say was much discovered, but neters mountly aplated, and is is remarkable, that throughout the whole in this elelant disturbance of the earlie, it continued gatte poover, and during at not their execution with the withtime of the land. About tent o'clock to the afternoons, the unless her trees motive placening, and just harings sometime the claude reflected a leight copper colony, auditord with fire Bearing had the day though when the theorem hurst at tempth promotivally from the rentry, through the more it course, the relies of the tarneter loveness more and and dustinating a starting Burhan spointly exercised, attended, with found clopes and may, indeed, the named house. Time only who have original waits a sight, compact and like of the monthly one and versely of the lighteness and about that of more linked and appears in ale we gree the programmentary column from the comes, where

shooting upwards from the mouth like rockets of the most dazzling lustre-others like shells, with their trailing fuses, flying in different parabolas, with the most vivid scintillations from the dark sanguine column, which now seemed inflexible, and immoveable by the wind. Shortly after seven in the afternoon, the mighty cauldron was seen to simmer, and the ebullition of lava to break out on the N. This, immediately after boiling over the orifice, and flowing a short way, was opposed by the acclivity of a higher point of land, over which it was impelled by the immense tide of liquefied fire which drove it on, forming the figure V in grand illumination. Sometimes, when the ebullition slackened, or was insufficient to urge it over the obstructing hill, it recoiled like a refluent billow, from the rock, and then again rushed forward, impelled by fresh supplies, and, surmounting every obstacle, carried rocks and woods together, in its course down the slope of the mountain, until it precipitated itself down some vast ravine, concealed from our sight by the intervening ridges of Morne Ronde. Vast globular bodies of fire were seen projected from the fiery furnace, and, bursting, fell back into it, or over it, on the surrounding bushes, which were instantly set in flames. About four hours from the lava boiling over the crater, it reached the sea, as we could observe from the reflection of the fire and electric flashes attending it. About half past one; the following morning, another stream of lava was seen descending to the eastward towards Rabacca. The thundering noise of the mountain. and the vibration of sound that had been so formidable hitherto, now mingled in the sudden monotonous roar of the rolling lava, became so terrible, that dismay was almost turned into despair. At this time the first earthquake was felt: this was followed by showers of cinders, which fell with the hissing noise of hail, during two hours.

"At 3 o'clock, a rolling on the roofs of the houses indicated a fall of stones, which soon thickened, and at length elescended in a rain of intermingled fire, which threatened at once the fate of Pompeii, or Herculaneum. The crackling coruscations from the crater at this period exceeded all that had yet passed. The eyes were struck with momentary blindness, and the ears stunned with a confusion of sounds. People sought shelter in the cellars, under rocks.

or now when. For every place was sensity the cases, and size shown, or wearnest, flying transitions had, were knowledged for the open atc. See and house were of on tree. The cases of artisted to the immediate victors, accused desired to do arraptous. But the immediate victors, accused desired to do arraptous. But the immediate victors, accused the new to proportion to their over most always remained house compact their to their sections, and agrees a desirement town on, over allowand of their partial gravity, and will alcount up highs no parison, the artists are not a term of the least with a large as a man't break. This described was a standard to a parison of standard twin at others and five bested upon order of an large, and was again occase for by and maximum till 60 also k in the manners. Entitionship followed another part of the colonial was large onter of continued and distinue pare accused by classic remaining the forest or the transition of continued and distinue pare accused by classic resolutionship of the part of the colonial was large and and or bentiaged in an analysis of the part of the colonial was large.

The break of day, it must it could be called, was tester coulded. Unrest darkness prevented till eight of the \$\), and do hards in Alay staward the che day of pulmerant is a chartic gloom enveloped the immediate, and unique to produce the ble less than even to easy of the whole along one the easy of the kinguish charts of a application of and broken makes all volumes are self-cities, which is and broken makes at volume makes. It was too valid the attenues, that the nature of assertions of the momentum can be produced to it is not been able productly till a collection and terminal data are the form of the colline and terminal data are the first colline and the colline and terminal data are the first colline and the second data are the colline and the colline are the first colline and the colline are the colline are the first colline are the colline are the colline and the colline are the colline ar

THE PEAK OF DERBYSHIRE.

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The Peak concerns of a chair of blots committee in the Commit of Steeles, and two twen long extensions, no well on account of the comment productions, and natural environity to general, no of what we collect as Amary Branches. So if there are natural, namely Peak of this, Elder Hustler Frak Course, in the Pract's Minde Mindler, M. Richeller M. and On Edding and Manager Hall. There is evaluated the exact the series of the contract of the contr

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Buxton, is a vast cavern formed by nature in the limestone rock, and was, according to tradition, the residence of an out-law, named Poole. The entrance is low and contracted, and the passage narrow; but this widening, at length, leads to a lofty and spacious cavern, from the roof of which stalactics or transparent crystals, formed by the constant dropping of water laden with calcareous matter, hang in spiral masses. Other portions of these petrifactions drap and attach themselves to the floor, rising in cones, and, becoming what are termed stalaguates.

One of the dropping stalactites, of an immense size, called the flitch of bacon, occurs about the middle of the cavern, which here becomes very narrow, but soon spreads to a greater width, and continues large and lofty until the visitor reaches another surprisingly large mass of stalactite, to which the name of Mary Queen of Scote' Pillar is given, , from the tradition of that unfortunate queen having paid a visit to the cavern, and proceeded thus far into its recesses. As this pillar cannot be passed without some difficulty few persons venture beyond it; nor does it seem desirable, as, by proceeding thus far, a very competent idea of the cavern may be formed. The path hitherto is along the side. and at some height from the bottom of the cavern; but to visit and examine the interior extremity, it becomes necessary to descend a few yards by very slippery and ill-formed steps. The path at the bottom is tolerably even and level for about sixty feet, when an almost perpendicular ascent commences, which leads to the extremity of the fissure, through the eye of St. Anthony's needle; a narrow strait, beyond which the steepness of the way is only to be surmounted by clambering over irregular masses of rock. The cavern terminates at nearly three bundred feet beyond the Queen of Scots' pillar. Towards the end is an aperture through a projecting rock, behind which a candle is generally placed, when any person has reached the extremity: when seen at that distance, it appears like adim star. The visitor returns along the bottom of the cavern, beneath a considerable portion of the road by which he entered; and, by thus changing the path, has an opportunity better to ascertain the height and width of the cavern in every part. and to view other accumulated petrifactions, some of which are of a prodigious size, and of an extraordinary form.

consequent in this processes has now speciment in a suspension view of that a small suspension which howevers arrive to the process, some through these had bough of the average to among in process through they appears or and lafty commonstry, which committee the major of the training of the following the training of the following collection of the other collections of the other collections of the other collections of the collection of the collections of the collections

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I've the line with first he absorbed he decomposed with what while with respect to the frequency, difficult from properties or to the inches depth of first tree, the mile than the first with the representation of the chief was been about the properties. The breakfile of the chiefs was been about the respective many inches about the properties. Within high feet in a first a force of the low rank, the reak appeared on the every and because it he was sed the fine of years, our first and the fine of years, our fine test and inches a force and the fines of years, our finestest and inches a force and

ciently strong to permit the reading of any book. The interior of the chasm he describes as consisting of two parts. which communicate with each other by a small arched passage, the one resembling an oven, the other the dome of a glass-house. On the south side of the latter, was a small opening, about twelve feet in length, and four feet in height, lined throughout with a kind of sparkling stalactite, of a fine deep yellow colour, with petrifying drops hanging from Tracing the entrance he found a noble column, above ninety feet high, of the same kind of incrustation. As he proceeded to the north, he came to a large stone which was covered with the same substance; and beneath it he found a hole six feet in depth, uniformly lined with it. From the edge of this hole sprung up a rocky ascent, sloping, like a buttress, against the side of the cavern, and consisting of vast, solid, round masses of the same substance and colour. Having climbed this ascent to the height of about sixty feet, he obtained some fine pieces of stalactite, which hung from the craggy sides of the cavern. Descending with some difficulty and danger, he proceeded in the same direction, and soon came to another pile of incrustations of a brown colour, above which he found a small cavern, opening into the side of the vault, which he now entered. Here he saw vast masses of stalactite, hanging like icicles from every part of the roof: several of these were four and five feet long, and thick as a man's body. The sides of the largest cavern were chiefly lined with incrustations of three kinds, the first of which was a deep yellow stalactite; the second, a thin coating which resembled a pale stone-colour varnish, and reflected the light of the candle with great splendour; and the third, a rough efflorence, the shoot of which resembled a rose flower.

The authors of a recent publication thus state the result of their observations and inquiries relative to Elden Hole. They describe the mouth of this chasm as opening horizontally, in a direction from north to south; its shape being nearly that of an irregular ellipsis, about minety feet in length, and twenty seven in breadth at the widest part. The northern end is fringed with small trees; and moss and underwood grow out of the crevices on each side, to the depth of forty or fifty feet. As the fissure recedes from the surface, it gradually contracts; and at the depth of

money according to a continuous constituted by the flow waves, on so in prevent its concess from the my harbor traced. Sunwille. eliminating the obstacles of the makes and purposting more of agone, it was sometime, and its depth by and not to necessit the hundred and two for we contracts dhort in seconomic with the appropriate of three minors, who had demanded in contribution the tractes of militaticals who were mission, and more influenced to live & brone orbitally min derect, and through

PRAK CAVERN.

PEAR CAVERY, also called the Pearl's Hotely one of these occumificant, authors, and extraoralizary madicalions of the ours, which conveniely exeme the countries and advocation of this lighthere. It has accombingly have conditioned one of the principal semilers of Durhydrise, and the heen rele-It has no the strongly of Cartle tun, and is approximated by a path or the sale or a shear regulat, leading in the houser, we seeme along of the rea's, as the extremity of which the caymin is atmiral. If would be difficult in impaire a second major aspect than this which per vine that to the visites at its commercy on much olds the large grey code concalined propositival at the the the height of a medical bosts, and naoting sub-oster at tally at a new grades, have a deep along years. In them, if in own faith by it said amony of rack, consider the inparameter of a depressional arely and expending, in waith, one hundred and roundy lost; to bught, forty swo; and in or caling depth, about ninery. They prepared up about minery (set than the envery the roof becomes lawer, and a pointer descent bonds, by a duta had such, to the interior comment of this transmission bullion. Here the light of day, burshing restricted of the spenting the white the winter and the winter to manufed with a great to illustrate his parther gargeress.

The progress now becomed a sectional, and to inliged to proceed, in a mapping positive, alout Iwenty pards, when he consider a squeetien opening, quantities it is lines, part it therees led to a mount lake, either the flower Pictor, shant and the in trapple, but are many how been a these ten in depth. These that he is amore year in a lowe or

the interior of the cavern, beneath a massive vault of rock, which in some parts descends to within eighteen or twenty inches of the water. "We stood some time," says M. de St. Fond, "on the brink of this lake; and the light of our dismal torches, which emitted a black smoke, reflecting our pale images from its bottom, we almost conceived we saw a troop of spectres starting from an abyes to welcome us. The illusion was extremely striking."

On landing, the visitor enters a spacious vacuity, 220 feet in length 200 feet in breadth, and in some parts 120 feet in height, opening into the bosom of the rock; but, from the want of light, neither the distant sides nor the roof of this abyss, can be seen. In a passage at the inner extremity of this vast cave, the stream which flows through the whole length of the cavern, spreads into what is called the Second Water, and near its termination is a projecting pile of rocks, known by the appellation of Roger Rain's House, from the incessant fall of water in large drops through the crevices of the roofs. Beyond this, opens another tremendous hollow, called the *Chancel*, where the rocks are much broken, and the sides covered with stalactical or petrified incrustations. Here the visitor is surprised by a vocal concert which bursts in discordant tones from the upper regions of the chasm. "Still," observes a modern tourist, "This being unexpected, and issuing from a quarter where no object can be seen, in a place where all is still as death, is calculated to impress the imagination with solemn ideas, and can seldom be heard without that emotion of awe and pleasure, astonishment and delight, which is one of the most interesting feelings of the mind." At the conclusion of the strain, the choristers, who consist of eight or ten women and children, are seen ranged in the hollow of the rock, about fifty feet above the floor.

The path now leads to a place whimsically called the Devil's Cellar and Half-way House, and thence, by three natural and regular arches, to a vast concavity, which, from its uniform bell-like appearance, is called Great Tom of Lincoln. When illuminated by a strong light, this concavity has a very pleasing effect; the symmetrical disposition of the rocks, the stream flowing beneath, and the spiracles in the roof, forming a very interesting picture. From this

usual the vanis gradually determine, the passing contracts, and at length does not leave more than anticient ranto by the cases of the assesses, what transforms to flavor through a substitutions classes of the average into a nestent, as to product by the amiliations brought into a fitte great returnation of the Pool. Forest,

The entire length of this wonderful execute to 2250 foot, nearly leaff a mile; and its depth, from the currice of the Peak muscidate, about 670 test. A carious office to pre-insend by the explosion of a could quantity of purpowers, wedged into the rank in the interval of the reverse; for the annual opposite to rail along the rail and online, like a pre-included upperson to rail along the rail and online. The effect of the Could be interested and an extraction of the residual fluid rails in particularly interval or particularly interval or particularly interval or particular or the data successor, is particularly interval or particular data railed to approached, to call go withit and of the most interval of a approached, to call go withit and of the most interval of the administration of a survival of the powerful or a carrier of the almost of the almost of the administration of a survival or particular of the almost of the alm

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Man Ton or the SHEVERING MOUNTAIN, Is a huge prei mego factor the own or authorist, chiefly composed of a perculiar kind of slone, which, slitting his rev has become it is required to the air, very enails equalibre to the an each expression. Hence it is preparationly would by the netton of also rate and answer, while the header and harms meaning in come to me time to received and throughyed, successed tall terms their presidence, and this with a rading main which is remountably we hard as to be lorgerflat Contiston, a destant? at two miles. The salley tensenth to avery helpe I with their legements to the extent of hull a note. To many passes of the presider, they jumiges, helper their descent. 9 reversion appearance, and even a remargle overlougion comes y, highly dangerments by appropriated. It is afformed by the most intelligent of the moghing my inhabitable, that this mountain charty wastes down a curt at storms of water and ten red Mr. Martle, who published no a count or Mag. Tor, in the Oldlewood of Person times by 1729, at turns, that the decay is not consensuly the same. The and one In apparand it is forety, fine amounted the always of right of the

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precipice, without tracing any other shivering in the mountain, beside that which was occasioned by the treading of his feet in the loose crumbled earth.

THE EBBING AND FLOWING WELL.

In the vicinity of Chapel-en-le-Frith is a steep hill, rising to the height of more than a hundred feet, immediately beneath which this natural phenomenon lies. It is of an irregular form, but nearly approaching to a square, from two or three feet in depth, and about twenty feet in width.

. Its ebbings and flowings are irregular, and dependent on the quantity of rain which falls in the different seasons of the year; when it begins to rise, the current can only be perceived by the slow movement of the blades of grass, or other light bodies floating on the surface; notwithstanding which, before the expiration of a minute, the water issues with a guggling noise, in considerable quantities, from several small apertures on the south and westing is not always alike: consequently the proportion of water it discharges at different periods, also varies. In the space of five minutes flowing, the water occasionally rises to the height of hix inches; and, after remaining a few seconds stationary, the well assumes its former quiescent state.

The cause of the intermittent flowing of this well may be satisfactorily explained, on the principle of the action of the syphon, and on the supposition of a natural one communicating with a cavity in the hill, where the water may be supposed to accumulate;—but for the phenomenon of its ebbing, no satisfactory reason has been assigned. The opinion of a second syphon, as ingenously advanced by a modern Tourist, which begins to act when the water rises, is inconsistent with the appearance of the well, and there-

fore cannot be just.

ST. ANNE'S WELL.

Tais Well, the usual resort of the company who frequent Buxton to drink the waters, has been classed among the wonders of the Peak, on account of this singularity—that within five feet of the hot spring by which it is supplied.

a cold one writes. This is not, however, the only well of the livel, anne but and cold springs the good rectingly in many point of hopping, and in other connectes. The square to conveyed to the well, which is an elegan charted holding, in the three-an early, from the uniqued spring, by a mirror pulsage, excluse and well continued to in present it from losing any considerable parties of the heat, and is received in a with markle boson. It is not as eveny or the Bath water, its temperature being about at degrees at halored, its temperature being about at degrees at halored set.

THE WIRESTSLAIGH ULYPON.

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The recovery to rection persists then grown and the definition of the rection of the vector field that the persists of the rectional very for receive a quarter of a mile, the opening decise, as how that it is improved by present, in particular partie, in a creek parties. The differency persists of the differency follows have been present as the rection of the rection of the continual every that at halfyon. Now abjects at an order consultant method these tree is placed and the Alama Character, the parties of the complete section of the continual and the continual a

Will be has a sense making rangements be what he is nonmagnet; but at the distance of about a builded purcurties, by a ranged dissam, he author whose is suffed the transfer of Provider. The transfer spins for it runned to compared to any other transferd, to, or broth, a business of paralleless of the transferd best high, and in the st eventy tree, provides as the top, suither the polyments are to a consider provider of tage of distance language from the roof. Candles placed among them give some idea of its being lighted up with elegant glass chandeliers; while the sides are entirely incrusted, and brilliant in the extreme.—The floor is chequered with black and white spar. It has altogether, Mr. Hutchinson observes, the most novel and elegant appearance of any cavern he ever beheld. This glittering apartment would be left by the visitor with a certain degree of regret, did he not expect to see it again on his return.

Still continuing a route similar to the one he has passed, in the course of which his attention is occasionally arrested by the curiosities of the place, and by the gentle droppings of the water, which scarcely break the solemn silence of the scene, he at length reaches the Grotto of Calypso, and the extremity of the cavern, upwards of 2000 feet from the entrance. To see this grotto to advantage, he has to ascend about six feet, into a recess. There, the beautiful appearance of the different crystallizations, some of them of an azure cast, and the echoes reverberating from side to side, make him fancy he has reached the secluded retreat of some mythological deity.

Returning by the same path for a considerable distance, another cavern, which branches in a south-west direction from the one already explored, presents itself. The roads here are still more difficult of access, but the stalactites are certainly most beautiful. Many of them, more than a yard in length, are pendent from the roof, and the greater part do not exceed the dimension of the smallest reed.—The top and sides of this cavern are remarkably smooth, particularly at the part called the Amphitheatre. In general, the stone is of a very dark colour, to which the transparent appearances before mentioned, with each a drop of water hanging at its extremity, form a fine contrast.

SPEEDWELL LEVEL.

In the Speedwell Level; or Navigation Mine, in the vicinity of Castleton, art has been combined with the subterraneous wonders of nature. Being provided with lights, the guide leads the visitor beneath an arched wault, by a flight of 106 steps, to the sough or level, where a boat is ready for his reception. and which is put in motion by

produced appeared pages friven man the wall her that purpose exercise the level brusto lake a terminatore unit, the real consignation line has been extended by the contract a strong state agod. Horn, travia, the tent, and awarding a marcontent above the level, the attention of the grater to deanimal to the short eman of the also a handard the first and to rese construct concess for less exceeded they, It has a on experienced aslet even emmered, and without on nevidentary dualities. to the depth of many test all it exempt and ghour, this her and that commences a great of allygons unless, and are with named the bottonties wit, the principlens corporate which may to some personal be controlled, by the corone stance at the heating evallowed up more than allithis rue of eighbids, made in blasting the meb, without any appara and discounting military is the depth of verent. The guidewent that the farmer line and loses guest stord a few three in principle to bedience that he arrival decide in standard was makente Mit part. There expense, houseness, buch burie in morphy channel in the board of the manner and one which the production estimate has found a passage. The supportioned water of the level field through a way or the mere this approximate ablemy, with a norw like a making me

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scenery by which this charming vale is distinguished, presents itself. The entrance is through a rock, which has been blasted for the purpose of opening a convenient passage;—and here a scene which blends the constituent principles of the picturesque, the beautiful, and the sublime, opens suddenly on the view. Through the middle of a narrow plain flows the Derwent, overhung by a profusion of luxuriant beeches and other drooping trees. Towards the east are gently rising grounds; and on the west the huge mural banks of the vale stretch along, the white face of the rock of which they are composed occasionally displaying itself through the woody clothing of their sides and summits. This magnificent scenery is singularly contrasted by the manufactories and lodging-houses at the bottom of the vale.

To see this magic spot to the greatest advantage, it should be entered at its northern extremity, its beauties then succeeding each other in a proper gradation, and their grandeur and effect being rendered more impressive. The chief attention is now attracted to the HIGH Tox. a grand and stupendous rock, which appears like a vast abrupt wall of limestone, and rises almost perpendicularly from the river, to the height of upwards of \$50 feet. The lower part of this majestic feature is shaded by yew-trees, elms, limes, and underwood of various foliage; but the upper part, for fifty or sixty yards, presents a ruggid front of one broad mass of perpendicular rock. From its summit the vale is seen in all its grandeur, diversified by woods of various hues and species. The windings of the Derwent, the greyish-coloured rocks, and the white fronts of the houses, embosomed amidst groves of trees which sprout from every crevice of the precipices, give variety and animation to a scene of wonderful beauty.

CHEE TOR.

In a romantic and deep hollow, near the little village of Wormhill, the river Wye flows beneath this stupendous mass of rock, which rises perpendicularly more than 360 feet above its level. The channel of the river, which meanders at the base, is confined between huge rocks of limestone, having such a general correspondence of situa-

the and it is, at to conder it products then they were consisted. In more parts they are partially exceeds without thereto, in the tree, and minurate out, while in other, there are totally noted, procupition, and importantly. In characteristic in a literature on early, and inputating. In these three they are interested on early, and in the other three they, and its department assessed in the left of the first three they are committed for an inputation of the other trees, and it processed only remarks the interest processed for and it processed only remarks the entry, a consistent five and its processed and protocompose and processed for exercise they are the other three interests of the interest processed and the interest processed of the constant of the first content the interest of the first trees that bettern on a deep descent. I consist the processed action in the lettern on a deep descent. I consist appreciate action in the lettern on a deep descent. I consist appreciate action in the lettern on a deep descent. I consist appreciate action in the lettern on a deep descent. I consist appreciate action in the lettern on a deep descent. I consist appreciate action in the lettern on a deep descent. I consist appreciate action in the lettern on a deep descent. I consist appreciate action in the lettern on a deep descent.

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The very high variance a directly appears to the Per-Line for the might is her deep upon. Its amount a course the Elevate of Markon, from the remaintains to the Lituries in the Locar mod that has resident on monarvalue in the manageness of the getting. Wells in 17 to. It replants the resident to a rate of the work to communic view of almost the whole length of the valley. Its considerable elevation above the surrounding objects greatly changes their general size and appearance. Even the High Ton seems considerably diminished in grandeur and sublimity; but this effect is partly compensated by the extent of the prospect, and the variety of objects it comprehends. The height of this eminence is about 750 feet, the path to its summit having been carried, in a winding direction, through a grove. At the one half of its ascent is an alcove, from which an extensive view of a great part of Matlock Dale may be seen, through a fine avenue formed for that purpose.

THE CUMBERLAND CAVERN.

'To the west and north-west of the village of Matlock are three apertures in the rock, respectively named the Cumberland, Smedley, and Rutland Caverns. The former of these is well deserving of a short notice.

The entrance is partly artificial, to afford a greater facility to the visitor, who has to descend fifty-four steps. The cavern now opens on him in solitary grandeur. masses of stone are piled on each other with a tremendous kind of carelessness, evidently produced by some violent concussion, though at an unknown period. He is conducted to a long and wide passage, the roof of which has all the regularity of a finished ceiling, and is bespangled by spars of various descriptions. From above, from beneath, and from the sides, the rays of the lights are reflected in every direction. In an adjacent compartment rocks are heaped on rocks in terrible array, and assume a threatening aspect. Next is an apartment decorated with what, in the language of the country, is called the snow fossil-a petrifaction which, both in figure and colour, resembles snow, as it is drifted by the winter storm into the cavities of a rock. Near the extremity of the cavern are to be seen fishes petrified and fixed in the several strata which form the surrounding recess. One of these has its back jutting out of the side of the earth, as if it had been petrified in the act of swimming. In another branch of the cavern a well has been found of a considerable depth.

REYNARD'S HOLE.

AFTER having proceeded about a mile in Dove Dale, the romantic and sublime beauties of which will be hereafter noticed, by a route constantly diversified by new fantastic forms, and uncouth combinations of rock, the visitor is led to a mass of mural rock, bearing the above name, and perforated by nature into a grand-arch, nearly approaching to the shape of the sharply-pointed gothic style of architecture, about forty-five feet in height, and in width twenty. Having passed through this arch, a steep ascent leads to a natural cavern, called REYNARD'S HALL, forty-five feet in length, fifteen in breadth, and in height thirty. the mouth of this cavern the scenery is singular, beautiful, and impressive. The face of the rock, which contains the arch rises immediately in front, and would effectually prevent the eye from ranging beyond its mighty barrier, did not its centre open into the above-mentioned arch, through which is seen a small part of the opposite side of the Dale, consisting of a mass of gloomy wood, from the shade of which a huge detached rock, solitary, cragged, and pointed, starts out to a great height, and forms an object truly sub-This rock which has received the name of Dove DALE CHURCH, is pleasingly contrasted by the little pastoral river, Dove, and by its verdant turfy banks. A narrow opening at the extremity of the cavern is supposed to lead to other similar cavities in the rock; and on the left is a cavern, about forty feet in length, in breadth fourteen, and in height twenty-six, called REYNARD'S KITCHEN, from the interior of which a pleasing view is presented of the upper part of the dale, its river, and rocks.

After passing REYNARD'S HOLE, already described, the rocks rise more abrupt on either side, and appear in shapes more wild and irregular, but diversified and softened by

shrubs.

Dove Dale is nearly three miles in length; but from the sinuosity of its course, and its projecting precipices, the views are limited. Throughout the whole of this majestic feature of country, the river Dove flows, in the helcyon days of summer, with soft murmurs, innocently and transparently over its pebbly bed; but swells into rage during the

winter months. Little tusts of shrubs and underwood form islands in miniature within its bed, which enlarge and swell the other objects. The scenery of this Dale is distinguished from almost every other in the United Kingdoms, by the rugged, dissimilar, and frequently grotesque and fanciful appearance of the rocks. To employ the words of a late tourist, "It is, perhaps, on the whole one of the most pleasing sceneries of the kind any where to be met with. It has something peculiarly characteristic. Its detached, perpendicular rocks stamp it with an image entirely its own, and for that reason it affords the greater pleasure.—For it is in scenery as in life. We are most struck with the peculiarity of an original character, provided there be nothing offensive in it."

THOR'S HOUSE.

Where Hamps and Manifold, their cliffs among, Each in his flinty channel winds along, With lucid lines the dusky moor divides, Hurrying to intermix their sister tides, Where still their silver-bosom'd nymphs abhor The blood-smear'd mansion of gigantic THOR-Erst fires volcanic in the marble womb Of cloud-wrapp'd WHETTON rais'd the massy dome Rocks rear'd on rocks, in huge disjointed piles, Form the tall turrets, and the lengthen'd aisles; Broad pond'rous piers sustain the roof, and wide Branch the vast rainbow ribs from side to side. While from above, descends, in milky streams, One scanty pencil of illusive beams, Suspended crags, and gaping gulfs illumes, And gilds the horrors of the deepen'd glooms, -Here oft the Naiads, as they chance to stray Near the dread Fane, on Thor's returning day, Saw from red altars streams of guiltless blood, . Stath their green reed-beds, and pollute their flood; Heard dying babes in wicker prisons wail, And shricks of matrons thrill the affrighted gale; While from dark caves infernal echoes mock, And fiends triumphant shout from every rock !

DARWIN.

This spacious cavern is situated about two miles above Dove Dale, near the village of Whetton; and tradition says the Druids here offered human sacrifices, inclosed in wicker idols, to Thor, the principal deity of the Saxons

and Danes, in the ages of their idolatrous worship. Beneath is an extensive and romantic common, where the rivers Hamps and Manifold sink into the earth, and rise again in Islam gardens. These rivers merit a brief descrip-A wooden bridge has been thrown over an abyss in the rock, out of which the river MANIFOLD bursts with surprising force, after having pursued a subterraneous course of five miles, from the point where it had engulfed itself in the earth, called WESTON HILL. At the further distance of twenty yards a similar phenomenon occurs; for here another fissure of a rock presents itself, whence the river Hamps throws its water into day. This river disappears at LEEK-WATER Houses, a place between LEEK and Ash-BOURN; thus pursuing a subterraneous course of seven miles, before it again emerges into light. On their emersion, the temperature of the two rivers differ two degrees and a half, the HAMPS being the coldest.

THE LOVERS' LEAP.

THE environs of Buxton abound in romantic sites, among the most striking of which is the Dale named the Lovens' LEAP, on account of a vast precipice which forms one side of a narrow chasm, and from the summit of which a lovelorn female is said to have precipitated herself into the rocky gulf below. Each side of this beautiful dell is bounded by elevated rocks, the proximity of which is such, that for a considerable space there is scarcely room for the passage of the bubbling current of the Wye. Several of these rocks are perpendicular, and bare of vegetation; while others are covered with ivy, yew, and ash-wood, with a craggy steep occasionally starting through the verdure.-A circular road, extending in circumference about three miles, passes in view of the most romantic part of this dale, and forms a very agreeable walk or ride from Buxton. the southern extremity the scenery assumes a milder character, the hollow taking the name of MILL DALE, from a mill which is turned by the stream. In conjunction with a rude bridge, a mountainous path, and other rural objects, this forms a very picturesque view. Another fine scene is presented by a lofty rock, called Swallow Ton, which soars over a mass of wood, the river at its base foaming and roaring over broken masses of limestone.

THE MOORS.

DERBYSHIRE is every where fruitful in natural curiosities. among the most striking of which may be reckoned the Moors of Hope Parish, inasmuch as they afford an extraordinary instance of the preservation of human bodies interred in them. In the year 1674 a grazier and his female servant in crossing these moors on their way to Ireland, were lost in the snow, with which they were covered from January to May, when on their being found, the bodies were so offensive that the Coroner ordered them to be buried on the spot. After a lapse of twenty-nine years, on the ground being opened, they were in no way changed, the colour of the skin being fair and natural, and the flesh as soft as that of persons newly dead. For twenty succeeding years they were occasionally exposed as a spectacle, but carefully covered after being viewed. They lay at the depth of about three feet, in a moist soil or moss. The Minister of Hope Parish was present in 1716, forty-two years after the accident, at a particular inspection of these bodies. On the stockings being drawn off, the man's legs, which had not been uncovered before, were quite fair: the flesh, when pressed by the finger, pitted a little; and the joints played freely, without the least stiffuess. Such parts of the clothing as the avidity of the country people, to possess so great a curiosity, had spared, were firm and good; and a piece of new serge, worn by the woman, did not appear to have undergone any sensible change.

OTHER ENGLISH CURIOSITIES.

Having thus brought to a conclusion our details relative to the wonders of the Peak, and the various and interesting natural curiosities there to be found, we subjoin a brief notice of several others, which have, in our island, attracted the notice of travellers.

Among the extraordinary caverns to be found in the mountains of the north of England, may be reckoned Yordas Cave, in the vale of Kingsland, in Yorkshire, which contains a subterraneous cascade. Whethercot Cave, not far from Ingleton, is divided by an arch of limestones, pass-

ing under which is seen a large cascade falling from a height of more than sixty feet. The length of this Cave is about one hundred and eighty-feet, and the breadth

ninety.

There are also in various parts of England many remarkable springs, of which some are impregnated either with salt, as that of Droitwich, in Worcestershire; or sulphur as the famous well of Wigan, in Lancashire, or bituminous matter, as that at Pitchford, in Shropshire. Others have a petrifying quality; as that near Lutterworth; in Leicestershire, and a dropping well in the West Riding of Yorkshire. And, finally, some ebb and flow, as that of the Peak described above, and Laywell near Torbay, whose waters rise and fall several times in an hour. To these we may add that remarkable fountain near Richard's Castle, in Herefordshire, commonly called Bone Well, which is generally full of small bones, like those of frogs or fishes, though often cleared out. At a cliff near Wigan, in Lancashire, is the famous burning well; the water is cold, neither has it any smell; yet so strong a vapour of sulphur issues out with the stream, that upon applying a light to it, the top of the water is covered with a flame, like that of burning spirits, which lasts several hours, and emits such a heat that meat may be boiled over it.

BRITISH MOUNTAINS.

THE British Isles present many mountains of a bold and imposing character: when contrasted, however, with those which have been already described, they must be considered as comparatively diminutive.

BEN NEVIS.

The loftiest of these mountains is Ben Nevis, in Scotland, its elevation above the level of the sea being 4380 feet, somewhat more than four-fifths of a mile. It terminates in a point, and elevates its rugged front far above all the neighbouring mountains. It is of easy ascent; and at the perpendicular height of 1500 feet, the vale beneath presents a wyy

agreeable prospect, the vista being beautified by a diversity of bushes, shrubs, and birch woods, besides many little verdant spots. The sea and the shore are also seen.

At the summit, the view extends at once across the Island, eastwards towards the German sea, and westward to the Atlantic Ocean. Nature here appears on a majestic scale and the vastness of the prospect engages the whole attention, at the same time the objects in view are of no common dimensions. Just over the opening of the sound, at the south west-corner of Mull, Colonsay rises out of the sea like a shade of mist, at the distance of more than ninety miles. Shuna and Lismore appear like small spots of rich verdure, and, though nearly thirty miles distant. seem quite under the spectator. The low parts of Jura cannot be discerned, nor any part of Isla; far less the coast of Ireland, as has been asserted. Such is, however, the wide extent of view, that it extends 170 miles from the horizon of the sea at the Murray Frith, on the N. E. to the Island of Colonsay, on the S. W.

On the N. E. side of Ben Nevis is an almost perpendicular precipice, certainly not less than 1400 feet in depth: probably more, as it appears to exceed the third part of the entire height of the mountain. A stranger is astonished at the sight of this dreadful rock, which has a quantity of snow lodged in its bosom throughout the whole year. The sound of a stone thrown over the cliff to the bottom, cannot be heard when it falls, so that it is impossible to ascertain

in that way the height of the precipice.

SNOWDON.

[See Plate, No. 20.]

This is the lostiest of the Welch mountains, its elevation above the level of the sea being 3720 feet, nearly three quarters of a mile. It is accessible on one side only, its flanks being in every other quarter precipitous. Its aspect soon convinces the spectator he is not to look to the Alps alone, or to the rocky regions of Altai, bordering on Siberia, for romantic scenes of wilderness, confusion, and disorder. Snowdon presents them in all their rude and native majesty.

In the ascent, a narrow path not more than nine feet in width, leads along the margin of a frightful precipice of

nearly 1500 feet in extent, so perpendicular that it cannot be approached without terror; while to the north of the summit nearest to the one the most elevated, a semi-amphitheatre of precipitous rocks, also of a great height, is seen; and, behind this summit, another semicircle of equal depth and extent. The loftiest summit here appears to descend in the form of a sharp ridge, and beneath it another appears, which, on account of its colour, is called the BLACK ROCK. From the upper part of the valley one of these summits presents a grand, vertical, and very elevated point.

The bottom of each of the amphitheatres of rocks, thirteen in number, is occupied by a small lake of a circular form, and very deep. The one known by the name of Llvn Glass is remarkable for its green hue, derived from its being impregnated with copper, several mines of which line its borders. Than this mountain nothing in the Alps can be more arid and desert, those regions alone excepted which are too lofty to admit of vegetation. Here there is not a tree; not even a shrub: small patches of verdure, which sheep can scarcely reach, are alone to be seen. Its summit, or highest peak, is a flat of about eighteen feet only in circumference. Thence may be seen a part of Ireland, a part of Scotland, Cumberland, Lancashire, Cheshire, all North Wales, the Isle of Man, and the Irish and British seas, with innumerable lakes: while the whole Island of Anglesen is displayed so distinctly, that its flat uncultivated plains, bounded by the rich Parys mountain in the vicinity of Holyhead, may be descried as on a map.

CADER IDRIS.

To the south of Dolgellau, Cader Idris towers above the subject mountains, which seem to retire, to allow its base more room to stand, and to afford to their sovereign a better display. It stands on a broad rocky base, with a gradual ascent to its brow, when the peaks elevate themselves in a manner at once abrupt, picturesque, and distinct. The point emphatically named Cader, appears to the eye below to be little superior in height to the saddle; but the third point, or apex, which has a name expressive of its sterility, is neither equal in height, nor in beauty, to the

other two. On its loftiest peak a stone pillar has lately been erected, for the purpose of a trigonometrical survey.

CADER IDERS is the commencement of a chain of primitive mountains, and is computed to be 2850 feet above the green of Dolgelly, and 3550 feet, nearly three-fourths of a mile above the level of the sea. A recent traveller has attempted to demonstrate that at some remote period it was a volcano of immense magnitude.

The tract to the south of CADER IDRIS, as far as Talylyn and Malwydd, is peculiarly grand. High and rugged mountains of every possible form close in on all sides, while huge masses of rock hang over, or lie scattered in mishapen fragments by the side of the road. To add to the effect of this scene, the river Difi forms one continued cataract for five or six miles, overflowing with the innumerable tributary torrents which precipitate themselves from the highest summits of the surrounding rocks; while, to crown the whole, the shady head of CADER IDRIS towers, the majestic centiuel of the group.

PENMAN MAWR.

The country of Caernarvon, in which this mountain is situated, claims precedency over every other in Wales, for the lostiness of its mountains, and the multitude of the eminences which in a curved and indented chain, occupy nearly the whole of its extent.

In proceeding from Conway to Bangor, by a route at once picturesque and romantic, and amid a scenery which varies at every step, Penman-mawr discloses to the traveller its bulky head. It protrudes itself into the sea, and exhibits a fine contrast to the fertility which it interrupts, by a rude view of grey weather-beaten stones and precipices. The passage over the mountain was formerly terrific; but the road has been latterly widened, and secured, near the verge of the precipice, by a small wall about five feet in height. It forms the most sublime terrace in the British Isles, winding round the mountain on the edge of the abrupt cliff; while the vast impending rocks above, the roaring of the waves at a great distance below, and the frequent howling of the wind, all unite to fill the mind with solemnity and awe.

SKIDDAW.

This English mountain, which has an elevation of 3530 feet, nearly three fourths of a mile, above the level of the sea, is situated in Cumberland. It is more remarkable on account of the scenery over which it presides, and which exceeds in beauty whatever the imagination can paint, than for those bold projections and that rugged majesty which might be expected, but which will be here sought in vain. Except at such a distance as smooths the embossed work of all these rich fabrics, and where its double summit makes it a distinguished object to mark and characterize a scene, it may be considered as a tame and inanimate object.

WHARNSIDE.

In the map of Yorkshire, by Jeffries, the height of this mountain is greatly exaggerated, its elevation above the sea not being more than 2500 leet, nearly half a mile. As it is situated in the midst of a vast amphitheatre of hills, the prospect it affords is diversified with pleasing objects. On its summit are four or five small lakes, two of which are about nine hundred feet in length, and nearly the same in breadth. A thin seam of coal also occurs near the top, and another is said to correspond with it on the summit of the lofty Colm-hill, on the opposite side of Dent-dale. Numerous caves and other natural curiosities abound here, as well as on Pennigent, about six miles to the eastward of Ingleborough. These latter mountains do not possess any particular interest.

STROMBOLI.

[See Plate, No. 19.]

This is the principal of the cluster of small Islands, lying to the north of Sicily, named the Lipari Isles, the whole of which contain volcanoes. At a distance its form appears to be that of an exact cone, but on a closer examination it is found to be a mountain having two summits of different heights, the sides of which have been toru and

shattered by craters. The most elevated summit, inclining to the S. W. is agreeably to Spallanzani, about a mile

in height.

In this volcanic mountain the effects of a constantly active fire are every where visible, heaping up, destroying, changing, and overturning every instant what itself has produced, and incessantly varying in its operations. At the distance of one hundred miles the flames it emits are visible, whence it has been aptly denominated the light-house of that part of the Mediterranean Sea.

From the more elevated summit, all the inner part of the burning crater, and the mode of its eruption, may be It is placed about half way up, on the N. W. side of the mountain, and has a diameter not exceeding 250 feet. Burning stones are thrown up at regular intervals of seven or eight minutes, ascending in somewhat diverging While a portion of them roll down towards the sea, the greater part fall back into the crater; and these being again cast out by a subsequent eruption, are thus tossed about until they are broken and reduced to ashes. The lcano, however, constantly supplies others, and seems inexhaustible in this species of productions. Spallanzani affirms that, in the more violent eruptions, the ejected matter rises to the height of half a mile, or even higher, many of the ignited stones being thrown above the highest summit of the mountain.

The erupted stones, which appear black in the day-time, have at night a deep red colour, and sparkle like fire-works. Each explosion is accompanied by flames or smoke, the latter resembling clouds, in the lower part black, in the upper white and shining, and separating into globular and irregular forms. In particularly high winds from the S. or S. E. the smoke spreads over every part of the island. Spallanzani observed this volcano on a particular night, when the latter of these winds blew with great violence. The clear sky exhibited the appearance of a beautiful aurora borealls over that part of the mountain on which the volcano is situated, and which from time to time became more red and brilliant, in proportion as the ignited stones were thrown to a greater height. The violence of the convulsions depends on that of the wind.

The present crater has burned for more than a century.

without any apparent change having taken place in its situ-The side from which the showers of ignited matter fall into the sea, is almost perpendicular, about half a mile broad at the bottom, and a mile in length, terminating above in a point. In rolling down, the lava raises the fine sand like a cloud of dust. While this was observed by Spallanzani, the volcano suddenly made an eruption. Numerous pieces of lava, of a dark red colour, and enveloped in smoke, were ejected from the top of the precipice, and thrown high into the air. A part of them fell on the declivity, and rolled down, the smaller preceded by the greater; and, after a few bounds, dashed into the sea, giving out a sharp hissing sound. The more minute fragments, from their lightness and the hindrance of the sand, rolled slowly down and striking against each other, produced nearly the same sound as hail stones falling on a roof. In a few minutes another explosion followed, without any sensible noise; and two minutes after, a third eruption took place, with a much louder explosion than the first, and a far more copious ejection of lava. The eruptions, which were almost innumerable during the time Spallanzani remained there, all exhibited the same appearances.

. On the night following the one above described, the volcano raged with still greater violence, and rapidly hurled to a great height thousands of red-hot stones, forming diverging rays in the air. Those which rolled down the precipice produced a hail of streaming fire, which illuminated the steep descent. Independently of these ignited stones, there was in the air which hovered over the volcano, a vivid light which was not extinguished when that was at rest. It was not properly flame, but real light reverberated by the atmosphere, impregnated by extraneous particles, and more especially by the ascending smoke. varying in intensity, it appeared constantly in motion, ascending, descending, dilating, and contracting, but always remaining perpendicular over the mouth of the volcano, which showed that it was occasioned by the conflagration within the crater. The detonations in the greater eruptions resembled the roaring of distant thunder; but, in the more moderate ones, the explosions of a mine. In the smallest they were scarcely audible. Each was some sec-

onds later than the ejection.

Near the month of the volcano is a small cavern, a projection above which secures it from the entrance of the ignited stones. From this cavern Spallanzani was enabled to look down into the very bowels of the volcano. He describes the edges of the crater as of a circular form, and not more than 340 feet in circumference, the internal sides contracting as they descend, and assuming the shape of a truncated inverted cone. The crater itself, to a certain height, is filled with a liquid red-hot matter, resembling melted brass. This is the fluid lava, which appears to be agitated by two distinct motions, the one intestine, whirling and tumultuous, and the other that by which it is impelled upward. This liquid matter is raised, sometimes with more, and sometimes with less rapidity, within the crater; and when it has reached within twenty-five or thirty feet of the upper edge, a sound is heard not unlike a short clap of thunder, while at the same moment a portion of the lava, separated into a thousand pieces, is thrown up with indescribable swiftness, accompanied by a copious eruption of smoke, ashes, and sand. A few moments before the report, the superficies of the lava is inflated and covered with large bubbles, some of which are several feet in diameter; on the bursting of these the detonation and fiery shower take place. After the explosion, the lava within the crater sinks, but soon rises again as before, and new bubbles appear, which again burst and produce new explosions. When the lava sinks, it gives little or no sound; but when it rises, and particularly when it begins to be inflated with bubbles, it is accompanied by a noise similar, in proportion to the difference of magnitude, to that of liquor boiling vehemently in a cauldron.

LIPARI.

This island, which has given name to the whole cluster, is deserving of notice on account of its celebrated stoves. They are the only vestiges of subterraneous conflagration now remaining, and lie to the west of the city, on the summit of a mountain of considerable elevation, called Monte Della Stuff, the Mountain of Stoves. They consist of five excavations, in the form of grottoes; but two of them have been abandoned on account of the great

beat, an exposure to which might cause suffocation. Even the stones are so hot that they cannot be touched; but still the heat varies, and experiences all the vicissitudes of volcanoes. The ground is not penetrated with hot vapours issuing from several apertures, as has been asserted: Spallanzani, however, found one from which a thin stream of smoke issued from time to time, with a strong sulphureous smell indicating the remains of conflagration existing beneath.

It is impossible to fix the exact epoch at which the fires of Lipari were extinguished, or rather the period at which the eruption ceased, for the existence of the former may be deduced from the hot springs and stoves. Dolomieu thinks the last eruptions are as old as the sixth century of the Christian era, and conjectures that they may have ceased since the fires found a new vent in Vulcano, since he does not entertain any doubt but that the two islands have a subterraneous communication. Of this the inhabitants of Lipari are so well convinced, that they are in the greatest agitation when Vulcano does not smoke, and when its passages are obstructed. They fear shocks and violent eruptions, suspecting even that the fires may again break out in their own island. It is certainly a fact that the earthquakes, which are very frequent, generally cease when the eruptions of Vulcano commence.

VULCANO.

Thus, which is the last of the Lipari isles, bears in every part the stamp of fire. It was the superstitious belief of the ancient inhabitants that Vulcan had here established his forges, there being constant fires during the night, and a thick smoke throughout the day. It consists of a mountain in the form of a truncated cone, which is, however, merely a case opening and exposing to view a second cone within, more exact than the other, and in which the mouth of the volcano is placed. The latter is thus enveloped on three sides by the ancient cone, and is open only on that side which is immediately washed by the sea.

The base of the interior cone is separated from the steep sides of the ancient crater by a circular valley, which terminates on one side at the junction of the two mountains, and on the other sinks into the sea. In this valley light pumice-stones are blended with fragments of black vit reous lava, and buried in ashes perfectly white. The blow of a hammer on these stones produces a loud hollow sound. which re-echoes in the neighbouring caverus, and proves that the surface is nothing more than the arch of a vault covering an immense abyss. The sound varies according to the thickness of the crust, which must have considerable solidity to support the weight of the new mountain. This. according to Dolomieu, is higher and steeper than the cone which contains the crater of Etna, and its access still more difficult; its perpendicular height, however, is not more than 2640 feet, half a mile. He represents the crater of Vulcano as the most magnificent he ever saw; and Spallanzani observes that, with the exception of that of Etna, he does not know of any more capacious and majestic. It exceeds a mile in circuit, has an oval mouth, and its greatest diameter is from the S. E. to the W., while its depth is not more than a quarter of a mile. The bottom is flat, and from many places streams of smoke exhale, emitting a strong sulphureous vapour. This vast cavity is very regular, and as its entire contents are displayed to the eye presents one of the grandest and most imposing spectacles in On large stones being rolled down, the mountain re-echoes; and on their reaching the bottom, they appear to sink in fluid. Indeed with the aid of a glass, two small lakes, supposed to be filled with melted sulphur, have been discovered. The declivity of the interior walls is so great, that, even when there is not any danger from fire, the descent is next to impossible. After considerable difficulty, however, this was accomplished by Spallanzani on the S. E. side, the only one accessible. He found the bottom to be somewhat more than one third of a mile in circumference, and of an oval form. The subterraneous noise was here much louder than on the summit, sounding like an impetuous river foaming beneath, or, rather, like a conflict of agitated waves meeting and clashing furiously together .-The ground was likewise in some places perforated with apertures, from which hissing sounds issued, resembling those produced by the bellows of a furnace. It shook when pressed by the feet; and a large piece of lava, let fall five or six feet, produced a subterraneous echoing sound, which continued some time, and was londest in the centre. These circumstances, combined with its burning heat, and the strong stench of sulphur it emits, prove that the fires of the volcano are still active.

Its eruptions have been most considerable during the earthquakes which have desolated Sicily and a greater part of Italy. In the month of March, 1786, after subterrasseous thunders and roarings, which were heard over all the Islands, to the great terror of the inhabitants, and were accompanied by frequent concussions, the crater threw out a prodigous quantity of sand, mixed with immense volumes of smoke and fire. This eruption continued fifteen days, and so great was the quantity of sand ejected that the circumjacent places were entirely covered with it to a considerable height. The lava did not flow at the time, at least over the edges of the crater; and indeed, such a current has not happened during the memory of any living person.

THE HIMALAYA MOUNTAINS.

BETWEEN INDIA AND THIBET.

The great Himalayan snewy range, says Mr. Fraser, is only the high elevated crest of the mountainous tract that divides the plain of Hindostan from those of Thibet, or Lesser Tartary. Far as they predominate over, and precipitously as they rear themselves above the rest, all the hills that appear in distant ranges, when viewed from the plains, are indeed only the roots and branches of this great stem; and, however difficult to trace, the connexion can always be detected between each inferior mountain and some particular member of its great origin.

The horizontal depth of this mountainous tract, on that side which overlooks Hindostan, is no doubt various; but, from the difficulty of the country, a traveller performs a journey of many days before he reaches the foot of the immediate snowy cliffs. The best observations and survey do not authorise the allowance of more than an average depth of about sixty miles from the plains to the commencement of these, in that part of the country that forms the subject of this narrative. The breadth of the snowy sone itself in all probability varies still more; for

huge masses advance in some places into the lower districts, and in others the crest recedes in long ravines, that are the beds of torrents, while behind they are clothed by a succession of the loftier cliffs. Every account we receive of a passage through them, (and this is no doubt found most commonly where the belt is narrowest,) gives a detail of many days' journey through the deserts of snow and rocks; and it is to be inferred, that on the north-east side they advance to, and retreat from the low ground in an equal irregular manner. Indeed, some accounts would induce the belief, that long ranges, crowned with snow-clad peaks, project in various places from the great spine, and include habitable and milder districts; for, in all the routes of which we have accounts, that proceed, in various directions towards the Trans-Himalayan countries, hills covered with snow are occasionally mentioned as occurring, even after the great deserts are passed, and the grazing country The breadth, then, of this crest of snow-clad rock itself cannot fairly be estimated at less than from seventy to eighty miles.

The great snowy belt, although its loftiest crest is broken into numberless cliffs and ravines, nevertheless presents a barrier perfectly impracticable, except in those places where hollows that become the beds of rivers have in some degree intersected it, and facilitated approach to its more remote recesses; and courageous and attentive perseverance has here and there, discovered a dangerous and difficult path, by which a possibility exists of penetrating across the range. Few rivers hold their course wholly through it: indeed, in the upper part in the Sutlej alone has been traced beyond this rocky barrier; and there is a path along its stream, from different parts of which roads diverge, that lead in various directions through the mountain. No reasonable doubt can now exist of the very long and extraordinary course which this river takes.

Captain Webb of the Bengal establishment, was lately employed on a survey of a province of Kumaoon. On the 21st day of June, his camp was 11,680 feet above Calcutta. The surface was covered with very rich vegetation as high as the knee: very extensive beds of strawberries in full flower; and plenty of currant-bushes in blossom all around, in a clear spot of rich black mould

soil. surrounded by a noble forest of pine, oak, and rhododendra. On the 22nd of June he reached the top of Pilgoenta-Churhaee, (or ascent,) 12,642 feet above Calcutta. He was prevented from distinguishing very distant objects by a dense fog around him; but there was not the smallest patch of snow near him, and the surface a fat black mould through which the rock peeped, was covered with strawberry plants (not yet in flower,) butter-cups, dandelion, and a profusion of other flowers. The shoulders of the hill above him, about 450 feet more elevated, were covered with the same to the top; and above 500 feet below was a forest of pine, rhododendron, and birch. There was some snow seen below in deep hollows, but it dissolves in the course of the season.

These facts led Captain Webb to infer, that the inferior limit of perpetual congelation on the Himala mountains is beyond 13,500 feet, at least, above the level of Calcutta: and that the level of the table land of Tartary, immediately bordering on the Himala, is very far elevated beyond 8000 feet, the height at which it has been estimated: and altho' I may not be able either to make all the deductions which they will afford, or to shun any errors that they may involve, they will still, I think, yield some ground of inference to estimate the height to which I ascended; and consequently, give some approximation to the heights of the surrounding peaks.

On the night of the 16th of July, we slept at Bheemkeudar, near the source of the Coonoo and Bheem streams.-There is no wood near this place, even in the very bottom of the valley, and we had left even the stunted birch at a considerable distance below: but there was a profusion of tlowers, ferns, thistles, &c. and luxuriant pasturage.-Captain Webb's limit of wood is at least as high as 12,000 to 12,300 feet. I would, therefore, presume the site of Bheemkendar to be considerably above that level; say 13,000 to 13,300 feet above the level of Calcutta. From thence we ascended at first rather gradually, and then very rapidly, till we left all luxuriant vegetation, and entered the region of stripped and scattered and partially melting snow, (for nearly two miles of the perambulator.) From calculating the distance passed, and advarting to the elevation we had attained. I would presume

that this was at least 1500 feet above Bheemkeudar, or

from 14,500 to 15,000 feet above Calcutta.

We proceeded onwards, ascending very rapidly, while vegetation decreased gradually to a mere green moss, with here and there a few snow-flowers starting through it; snow fast increasing, till at length we entered on what I presume was the perennial and unmelting snow, entirely beyond the line of vegetation, where the rock was bare even of linehens: and in this we ascended, as I think, about 800 feet; for, though Bamsooroo Ghat may not be so far above this line, we continued ascending, even after crossing that point, and I would incline to estimate this utmost extent of ascent at 2000 feet more, or nearly 17,000 feet above the level of Calcutta.

Whilst proposing to consider the point of 16,000 to 16,500 feet as that of inferior congelation, I must observe that there was no feeling of frost in the air, and the snow was moist, though hard, chiefly through the influence of a thick mist, which, in fact, amounted to a very small driszling rain, which fell around: all which would seem to indicate, that the true line of congelation had not there been attained; but we were surrounded by snow which evidently never melted. To a great depth below it extended all over the hills, very little broken, while on the valleys from whence the Coonoo and Bheem streams issue, at full 2000 feet below it lay covering them and the surrounding mountains in an unbroken mass, many hundred feet thick. Thus, though it may seem contradictory, the line of perpetual congelation, in fact seems fixable at even below the point I have ventured to indicate; and, I presume might, on these grounds, be placed somewhere between 15 and 16,000 feet above the level of Calcutta.

The result of all the considerations that arise out of the foregoing remarks is a belief, that the loftiest peaks of the Himala range will be found to fall considerably short of the height attributed to them by Mr. Colebrooke; and that their loftiest peaks do not more than range from 18,000 to 22 or 23,000 feet above the level of the sea.

Having reached the top of an ascent, we looked says Mr. Fraser, down upon a very deep and dark glen, called Palia Gadh, which is the outlet to the waters of one of the most terrific and gloomy valleys I have ever seen.

But it would not be easy to convey by any description a just idea of the peculiarly rugged and gloomy wildness of this glen: it looks like the ruins of nature, and appears, as is said to be, completely impracticable and impenetrable. Little is to be seen except dark rock: wood only fringes the lower parts and the waters' edge: perhaps the spots and streaks of snow, contrasting with the general blackness of the scene, heighten the appearance of desolation. No living thing is seen; no motion but that of the waters; no sound but their roar. Such a spot is suited to engender superstition, and here it is accordingly found in full growth. Many wild traditions are preserved, and many extravagant stories related of it.

The glen above described is by far the most gloomy savage scene we have yet met with. I regret that the weather did not permit a sketch of it to be attempted. Beyond this we could see nothing in the course of the river but rocky banks. The opposite side is particularly precipitous; yet along its face a road is carried, which is frequented as much as this, and leads to villages still farther up. By the time we had reached the village, the clouds which had lowered around and sunk down on the hills, began to burst with loud thunder and heavy rain. The noise was fearfully reverberated among the hills: and during the night more than once the sound was heard of fragments from the brows of the mountains, crashing down to the depths below with a terrific din. Our quarters were good. I slept in a temple, neat, clean and secure from the weather.

GUNGOTREE, THE SOURCE OF THE JUMNA, A BRANCH OF THE GANGES, IN THE HIMALA MOUNTAINS.

GUNGOTREE, the source of the Jumna, the most sacred branch of the Ganges, ought to hold and does bear the first rank among its holy places. Here, says Mr. Fraser, all is mythological if not holy ground. Here Mahadeo sits enthroned in clouds and mist amid rocks that defy the approach of living thing, and snows that make desolation more awful. Gods, goddesses, and saints here continually adore him at mysterious distance, and you traverse their familiar haunts. But, although Gungotree be the most sacred, it is not the most frequented siring.

access to it being far more difficult than to Buddrinauth; and consequently to this latter, pilgrims flock in crowds, appalled at the remoteness and danger of the former place of worship. This may pretty fully account for the superior riches and splendour of Buddrinauth. Here are temples of considerable extent, priests and officials in abundance, who preserve an imposing exterior, and an appearance venerable from power and comparative magnificence, and consequently procure rich and ample offerings to keep up their comfortable dignity.

The temple of Bhadri-Nath, is situated on the west bank of the Alackunda, in a valley four miles long, and one mile in its greatest breadth. The east bank rises considerably higher than the west bank, and is on a level with the top of the temple. The position of the sanctuary is considered equi-distant from two lofty mountains, which are designated by the names of the Nar and the Narayena Purvatas. The former is to the east, the latter to the west, and completely covered with snow from the summit to the

base.

The temple of Bhadri-Nath has more beneficed lands attached to it than any sacred Hindu establishment in this part of India. It is said to possess 700 villages in different parts of Gurwhal and Kumaoon: many of them have been conferred by the government; others have been given in pledge for loans; and some few, purchased by individu-

als, have been presented as religious offerings.

The annual ceremony of carrying the images of their gods to wash in the sacred stream of the Jumna is (it appears) one of much solemnity among the inhabitants of the neighbourhood; and the concourse of people here assembled has been busily engaged, and continues to be fully occupied in doing honor to it. They dance to the sound of strange music, and intoxicate themselves with a sort of vile spirit, brewed here from grain and particular roots, sometimes, it is said sharpened by pepper. The dance is most grotesque and savage: a multitude of men taking hands sometimes in a circle, sometimes in a fine, beating time with their feet, bend with one accord, first nearly to the earth with their faces, then backwards, and then sidewise, with various wild contortions. These, and their uncouth dress of black and grey blankets, give

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a peculiar air of brutal ferocity to the assemblage. The men dance all day, and in the evening they are joined by the women who mix indiscriminately with them, and keep up dancing and intoxication till the night is far advanced. They continue this frantic kind of worship for several days; and, in truth, it is much in unison with their general manners and habits,—savage and inconsistent.—At a place so sacred, the residence of so many Brahmins, and the resort of so many pious pilgrims, we might expect to find a strict attention to the forms of religion, and a scrupulous observance of the privations and austerities enjoined by it. So far, however, is this from the truth, that much is met with, shocking even to those Hindoos who are less bigotted.

There were several points to be arranged before we could set off for Gungotree, the source of the Jumna. I did not deem it proper to go unarmed; but agreed that only five men should be accoutred to attend us, and that I should myself carry my gun. But all these weapons of war were to be put aside before we got within sight of the holy spot, and deposited in a cave near it, under a guard. pledged myself that no use should be made of these instruments, nor any life sacrificed for the purpose of food, either by myself or by any of my people, after leaving the village, until we returned: moreover, that I would not even carry meat of any sort, dead or alive, along with me, but eat only rice and bread. As to the putting off my shoes, they did not even propose it to me, and it could not have been done; but I volunteered to put them off, when entering into the precincts of the temple and holier places, which pleased them greatly. All the Hindoos, including the Ghoorkhas, went from the village barefout.

Just at the end of the bridge there is an overhanging rock, under which worship is performed to Bhyram, and a black stone partly painted red, is the image of the god; and here prayers and worship alone were not performed, but every one was obliged to bathe and eat bread baked by the Brahmius, as preparatory to the great and effectual ablutions at the holier Gungotree. This occupied a considerable time, as the party was numerous: in the meantime I took a very imperfect sketch of the scene, after

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which I bathed myself at the proper place (which is the junction of the two streams,) while the Brahmin prayed over me. Among the ceremonies performed, he made me hold a tust of grass while he prayed, which at the conclusion he directed me to throw into the eddy occasioned by the meeting of the two waters.

By an unpleasant path we reached a step, or level spot on the first stage of the mountain, where, in a thick grove of fir trees, is placed a small temple to Bhyram, a plain white building, built by order of Umur Sing Thappa, who gave a sum of money to repair the road, and erect places of worship here, and at Gungotree.—Having paid our respects to Byramjee, we proceeded along the side of the hill on the right bank (north) of the river, gradually ascending by a path equally difficult and dangerous as the first part of our ascent, but more learful, as the precipice to the river, which rolls below us, increases in height, and exceedingly tollsome from the nature of the ground over which it passes, and which consists wholly of sharp fragments from the cliffs above, with tallen trunks and broken branches of trees.

The path increases in difficulty from the very irregular nature of the ground, as well as the steepness of the hill face across which it leads, ascending and descending as the small, though deep, watercourses furrow the mountain side, in loose soil, formed of small fragments fallen from above, and which slip down, threatening to carry the traveller to the guiph below. The shapeless blocks of rock now more completely obstructed the way, and for hundreds of yards, at times, the passenger must clamber over these masses, heaped as they are one upon another, in monstrous confusion, and so uncertain and unsteady, that, huge though they are, they shake and move even under the burthen of a man's weight. So painful indeed is this track, that it might be conceived as meant to serve as a penance. to the unfortunate pilgrims with bare feet, thus to prepare and render them worthy for the special and conclusive act of piety they have in view, as the object of their journey to these extreme wilds.

The spot which bears the name of Gungotree is concealed by the roughness of the ground, and the masses of allen rock, so as not to be seen till the traveller comes upon it.

The temple is situated precisely on the sacred stone on which Bhagirutte used to worship Mahadeo, and is a small building of a square shape for about twelve feet high, and rounding in, in the usual form of pagodas, to the top. It is quite plain, painted white, with red mouldings, and surmounted with the usual melon-shaped ornaments of these buildings. From the eastern face of the square, which is turned nearly to the sacred source. there is a small projection covered with a stone roof, in which is the entrance facing the east, and just opposite this there is a small pagoda-shaped temple to Bhyramiee. The whole is surrounded by a wall of unbewn stone and lime, and the space this contains is paved with flat In this space too there is a comfortable but small house for the residence of the Brahmins who come to officiate. Without the inclosure there are two or three sheds constructed of wood, called dhurus sallahs, built for the accommodation of pilgrims who resort here: and there are many caves around formed by overhanging stones, which yield a shelter to those who cannot find accommodation in the sheds.

The scene in which this holy place is situated is worthy of the mysterious sanctity attributed to it, and the reverence with which it is regarded. We have not here the confined gloominess of Bhyram Gattee: the actual dread which cannot but be inspired by the precipices and torrents, and perils of the place, here gives way to a sensation of awe, imposing but not embarrassing, that might be compared to the dark and dangerous pass to the centre of the ruins of a former world; for, most truly, there is little here that recalls the recollection of that which we seem to have quitted. The bare and peaked cliffs which shoot to the skies, yield not in ruggedness or elevation to any we have seen; their ruins lie in wild chaotic masses at their feet, and scantier wood imperfectly relieves their nakedness: even the dark pine more rarely roots itself in the deep chasms which time has worn. Thus on all sides is the prospect closed, except in front to the eastward; where, from behind a mass of bare spires, four huge, lofty, snowy peaks arise; these are the peaks of Roodroo-Himala.-There could be no finer finishing, no grandeur close to such a scene, as is visible in the engraving.

We approach it through a labyrinth of enormous shapeless masses, of granite, which during ages have fallen from the cliffs above that frown over the very temple, and in, all probability will some day themselves descend in ruins and crush it. Around the inclosure, and among these masses, for some distance up the mountain, a few fine old pine trees throw a dark shade, and form a magnificent fore-ground; while the river runs impetuously in its shingly bed, and the stifled but fearful sound of the stones which it rolls along with it, crushing together, mixes with the roar of its waters.

It is easy to write of rocks and wilds, of torrents and precipices; it is easy to tell of the awe such scenes inspire: this style and these descriptions are common and hackneyed. But it is not so simple, to many surely not very possible, to convey an adequate idea of the stern and rugged majesty of some scenes; to paint their lonely desertness, or describe the undefinable sensation of reverence and dread that steals over the mind while contemplating the death-like ghastly calm that is shed over them: and when at such a moment we remember our homes, our friends, our firesides, and all social intercourse with our fellows, and feel our present solitude, and far distance from all these dear ties, how vain it is to strive at description! Surely such a scene is Gungotree. (See Plate, No. 21.) Nor is it independent of the nature of the surrounding scenery, a spot which lightly calls forth powerful feelings. We were now in the centre of the stupendous Himala, the loftiest and perhaps most rugged range of mountains in the world. We were at the acknowledged source of that noble river equally an object of veneration and a source of fertility, plenty, and opulence to Hindostan; and we had now reached the holiest shrine of Hindoo worship which these holy hills contain. These are surely striking considerations, combining with the solemn graneur of the place, to move the feelings strongly.

The fortuitous circumstance of being the first European that ever penetrated to this spot was no matter of boast, for no great danger had been braved, no extraordinary fatigues undergone: the road is now open to any other who chooses to attempt it, but it was a matter of satisfaction to myself. The first object of inquiry that naturally

as care to the travelles, eiter casting a plane once the governal house age, is the source of the river. Here, as as formation, you are teld that no invest has some, in ran an torther towards to activine order than the spaid cand the difficulty is to had sort apparent. I such a trail to gate a public about two firstones is rout the temple, both for the purpose of observation trailer at the train, and of a try towards about the arminer and the river, and of a try towards with administrative point of view. Buy lossing with manufacture in another point of view, as the risk of he may precipitated and this recurs, I was here if to view has a

The empty is not more than two tables herefored discourse from the couple, and is a direction conferred to a made of the place if in its all probability closely magniors by the melanic of the great become a sone which remains the value, and what is because in the master and the great become at the great become at the great become at the great arms of t

The mountain, which is serom and to be the believe and presided of the about tauer in the quester, and prelocally you has no groupe in the popular Himpologic intempor the ment of flooding thing by and in both to be the throng ra graidence of Ababaden launall. It is also inflacingnamely called Ponch Porton, from the five peakers and Parameters Purhot, which is not to be combanated with the manufactures called may broggerhousels; and competings the control appellation of Kalio is present which literally everylass and amove hall, but so people to this properties by way of prosmanning It has nive principal posters collect floridge Himsle, Burningmany, Binnengamer, Ontours Kann, and Koneys Bannes. Times have a ent of anothermias ladders at very considerable extent. third with executioners, from the pradical documentary of the lower pasts of which the principal period the stream to paparented popularials those may be employ hostinwa lagrand the prime to the state above Guegorie, which who

Within the excepts there are three tangue: one, that of Nefi , and the chroned were their on which they were placed was west and spiled with the ofference would; there was a personne and it, but I know out who are it proceeded. The place, as usual, one lighted by a small knop one

day-light had admittance. Just below the temple, on the river side, grew three poplar-trees, and a few small larches: above there are the remains of a fine old silven firtree, which overshadows some of the caves and sheds. The whole people also bathed, and contributed something to the priesthood; and it was a matter of serious importance, as well as of great joy to every one, that we had thus happily reached a place of such supereminent sanctity: such, indeed, that the act of bathing here is supposed to cleanse from every sin heretofore committed, and the difficulty of which is so great, that few, except professional devotees, ever attempt reaching the holy place.

It is customary that those who have lost their father and mother, or either of these, shall be shaved at this spot; and it was curious to observe the whimsical changes produced by the operation, which numbers underwent. It appears also, that one chief ordinance was the going frequently round the holy temple; and we particularly observed that those who were noted as the greatest rogues were most forward in this pious exercise: one man, in particular, who had been a notorious thief, was unwearied

in his perseverance.

Well, indeed, do they say, that Seeva has formed these recesses which he inhabits, inaccessible to all but those whom true devotion leads to his shrine. That man must have been indeed strongly impelled by devotion, ambition, or curiosity, who first explored the way to Gungotree. were unavailing to enquire, and perhaps of little use, if known, to which of these motives we owe the enterprise; but patience, perseverance, and courage, must have been strongly united with it to lead him safely and successfully through those awful cliffs, that would bar the way to most Another omen of favour pointed out was, the increase of the river after bathing, as at Jumnotree; and it is singular enough, that during the time we remained here, I remarked several increases and decreases of the water, without any obvious causes; but these may fairly be referred to the effects of sudden changes of temperature occurring frequently among the hills, and acting on the body of snow that feeds the river.

ASIATIC.



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ASIATUS MOUNTAINS

A wines the Asiate burning mountains, a biref occourall which are uniformly while the above interesting matter of the grand Hanni eyn chala, those of Jupan are both a the kalife and remarkant. On the summer of a programity in the previous of Jugas to a large cavern, memority the mouth of a valence, but the flame of which has recent probable for a act of conductible matter. In the conthe Iralan Land at Long & personnell flater some Counties top of a animum. In the personne of Tradition is also other harmag magnitum, where was formely a real phywhich has one here one my five by the enterleanness of the workness, has been founday ever some. Sometimes a liketracks, accompanied by a very districted by the eleserved to have from the appropriate of a formula organizate called took by the prostner of Serven. This manipula to and to be month on high as the Penk of Tennelle, but in aliagre and himself to approved out to both on eighal. true is revered with proposal now. Belanding to the Lagranger shorter, and not have from I manufa, is a smooth to he Induced, which has been business and trendship be money containing; and in another analybehand, appears to Bontsuppose a colombia which has been burning at allegent De-

Captain Claps, when leaving lapsan, proceed by green totalities of particle arrives, except planes of which were taken up, and found to weigh from mechanism to three particle. It was competitived that these stress had been three as the sea try company of entire times, company or last was consequently because he land the high metallicities.

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88 VOLCANIC MOUNTAINS OF KAMTSCHATKA.

lence from the crater, as to reduce to ashes the forests on the neighbouring mountains. This was succeeded by a cloud of smoke, which overspread and darkened the whole country, until it was dissipated by a shower of cinders, which covered the ground to the distance of thirty miles. The third volcano is on the top of the particular mountain of Kamtschatka, which is described as by far the highest in the peninsula. It rises, from two rows of hills, somewhat in the form of a sugar-loaf, to a very great height. usually throws out ashes twice or thrice a year, sometimes in such quantities, that for three hundred versts, one hundred and sixty-five English miles, the earth is covered with them. In the year 1737, at the latter end of September, a conflagration, which lasted for a week, was so vielent and terrific, that the mountain appeared, to those who were fishing at sea, like one red-hot rock; and the flames which burst through several openings, with a dreadful noise, resembled rivers of fire. From the inside of the mountains were heard thunderings, crackings, and blasts like those of the strongest bellows, shaking all the neighbouring territory. During the night it was most terrible; but at length the conflagration ended by the mountain's casting forth a prodigious quantity of cinders and ashes, among which were porous stones, and glass of various colours. When Captain Clarke sailed out of the harbour of St. Peter and St. Paul, in June 1778, to the northward, an eruption of the first of these volcanoes was observed. A rumbling noise, resembling distant hollow thunder, was heard before day-light; and when the day broke, the decks and sides of the ships were covered with a fine dust. resembling emery, nearly an inch thick, the air at the same time being charged with this substance to such a degree, that towards the mountain, which is situated to the north of the harbour, the surrounding objects were not to be distinguished. About twelve o'clock, and during the afternoon, the explosions became louder, and were followed by showers of cinders, which were in general about the size of peas, though many were picked up on the deck larger than a hazel-nut. Along with the cinders fell several small stones which had not undergone any change from the action of fire.

VOLCANIC MOUNTAIN OF ALBAY.

THE following details of the dreadful eruption of the Volcano of Albay, in the Island of Luconia, one of the Philipines, on the 1st of February, 1814, are from an eye witness of the dreadful scenes it presented.

During thirteen years the Volcano of Albay had preserved a profound silence. It was no longer viewed with that distrust and horror with which volcanoes usually inspire those who inhabit the vicinity. Its extensive and spacious brow had been converted into highly cultivated and beautiful gardens. On the first day of January last, no person reflected, in the slightest degree, upon the damages and losses which so bad a neighbour had once occasioned. Previously to the former eruptions there had been heard certain subterraneous sounds, which were presages of them. But upon the present occasion we remarked nothing, ex-

cept that on the last day of January we perceived some slight shocks. In the night the shocks increased. At two in the morning one was felt more violent than those hitherto experienced. It was repeated at four, and from that time they were almost continual until the eruption commen-

ced. The day broke, and I scarcely ever remarked in Camarines a more serene and pleasant morning. I observed, however that the ridges nearest to the volcano were covered with mist, which I supposed to be the smoke of some house that might have been on fire in the night. But at eight o'clock the volcano began suddenly to emit a thick column of stones, sand, and ashes, which with the greatest velocity, was elevated into the highest regions of the atmosphere. At this sight we were filled with the utmost dread, especially when we observed that in an instant the brow of the volcano was quite covered. We had never seen a similar eruption, but were convinced that a river of fire was flowing towards us, and was about to consume us. The first thing which was done in my village was to secure the holy sacrament from profanation! we then betook ourselves to flight. The swiftness with which the dreadful tide rolled towards us, did not give us time cither for reflection or consultation. The frigthtful noise of the volcano caused great terror even in the stoutest hearts. We all ran, filled with dismay and consternation, endeavouring to reach the highest and most distant places, to preserve ourselves from so imminent a danger. The horizon began to darken, and our anxieties redoubled. The noise of the volcano continually increased, the darkness augmented, and we continued our flight. But, notwithstanding our swiftness, we were overtaken by a heavy shower of huge stones, by the violence of which many unfortunate persons were in a moment killed. This cruel circumstance obliged us to make a pause in our career, and to shelter ourselves under the houses; but the flames and burnt stones which fell from above, in a short time reduced them to ashes.

The sky was now completely overcast, and we remained enveloped and immersed in a thick and palpable darkness. From that moment reflection was at an end. The mother abandoned her children, the husband his wife, and the

chidren forgot their parents.

In the houses we had no longer any shelter. It was necessary to abandon, or perish with them; yet, to go out uncovered, was to expose one's self to a danger not less imminent, because many of the stones were of an enormous size, and they fell as thick as drops of rain. It was necessary to defend ourselves as well as we could. Some covered themselves with hides, others with tables and chairs, and others with boards and tea-trays. Many took refuge in the trunks of trees, others among the canes and hedges, and some hid themselves in a cave, when the brow of a mountain protected them.

About ten o'clock the heavy stones ceased to fall, and a rain of thick sand succeeded. At half past one the noise of the volcano began to diminish, and the horizon to clear a little; and at two it became quite tranquil; and we now began to perceive the dreadful ravages which the darkness had hitherto concealed from us. The ground was covered with dead bodies, part of whom had been killed by the stones, and the others consumed by the fire. Two hundred perished in the church of Budiao, and thirty-five in a single house in that village. The joy the living felt at having preserved themselves, was in many converted into the extremity of sorrow at finding themselves deprived of their relations and friends. Fathers found their children dead

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can only be conjectured by the effects produced. Nor is it more astonishing that inflamable substances should be found beneath the bottom of the sea, than at similar depths on land, and that there also the impetuous force of fire should cause the imprisoned air and elastic gasses to expand, and, by its mighty force, should drive the earth at the bottom of the sea above its surface. These Marine volcances are perhaps more frequent, though they do not so aften come within the reach of human observation, than those on land; and stupenduous must be the operations carried on, when matter is thrown up to an extent which the ingenuity of man does not enable him to reach by fathoming.

Many instances have occured, as well in ancient as in modern times, of Islands having been formed in the midst of the sea; and their sudden appearance has constantly been preceded by violent agitations of the surrounding waters, accompanied by dreadful noises, and in some instances, by fiery eruptions from the newly-formed isles, which are composed of various substances, frequently intermixed with a considerable quantity of volcanic lava.-Such Islands remain for ages barren, but in a long course of time become abundantly fruitful. It is a matter of curious inquiry, whether springs are found on such newly-created spots, when the convulsions which gave them birth have subsided; but on this point it would seem that we are not possessed of any certain information, as it does not appear that they have been visited by any naturalist with the express view of recording their properties.

Among the writers of antiquity who have transmitted accounts of Islands which have thus started up to the view of the astonished spectator, Seneca asserts that, in his time, the Island of Therasea, in the Eagen sea, was seen to rise in this manner, by several mariners who were sailing near the point of its ascent. Pliny's relation is still more extraordinary; for he says that in the Mediterranean, thirteen islands emerged at once from the sea, the cause of which he ascribes rather to the retiring of the waters, than to any subterraneous operation of nature: but he speaks at the same time of the island of Hiera, in the vicinity of Therasea, as having been formed by subterraneous explosions, and enumerates several others said to have been derived from a similar origin, in one of which he says, a great

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It is partie Green an Azelija han and the Armys that as are to link for the grandest and must surpressed testimon of this physicians. We will what an example from each of three granges of physics, beginning with the former.

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their boats. Amid these motions and tremblings the island increased, not only in height, but in length and breadth: still occasionally, while it was raised and extended on the one side, it sunk and diminished on the other. The nerson to whom we are indebted for this narrative, observed a rock to rise out of the sea, forty or fifty paces from the island, which, having been thus visible for four days, sunk and appeared no more: several others appeared and disappeared alternately, till at length they remained fixed and unmoved. In the meantime the colour of the surrounding sea was changed: at first it was of a light green, then reddish, and afterwards of a pale yellow, accompanied by a noisome stench, which spread itself over a part of the Island of Santorini.

On the 16th of July smoke first appeared, not indeed on the island, but issuing from a ridge of black stones which suddenly rose about sixty paces from it, where the depth of the sea was unfathomable. Thus there were two separate islands, one called the White, and the other the Black Island, from the different appearances they exhibited. This thick smoke was of a whitish colour, like that of a lime-kiln. and was carried by the wind to Santorini, where it pen-

etrated the houses of the inhabitants.

In the night between the 19th and 20th of July, flames began to issue with the smoke, to the great terror of the inhabitants of Santorini, especially of those occupying the castle of Scaro, who were distant about a mile and a half only from the burning island, which now increased very fast, large rocks daily springing up, which sometimes added to its length, and sometimes to its breadth. The smoke, also increased, and there not being any wind. ascended so high as to be seen at Candia, and other distant islands. During the night, it resembled a column of five, fifteen, or twenty feet in height; and the sea was then covered with a scurf or froth, in some places reddish, and in others yellowish, from which proceeded such a stench. that the inhabitants throughout the whole island of Santorini burnt perfumes in their houses, and made fires in the streets, to prevent infection. This, indeed, did not last above a day or two; for a strong gale of wind dispersed the froth, but drove the smoke on the vineyards of Santorini, by which the grapes were, in one night, parched up and

discreved. The miche also council violent least suballe gets it with energine -

Allowers places must the Island, where the outer toposed a porters einely, no blanded like all when heatenday to stramay. The senguand almost a mough, during which sime many lishes were found dead on the thorn of harmonic. On the following make a doll hallow more was found, like the distant report of expend common, which was mounts talkeness by themes of the abouting energy as as he will an the air, which they aretisally damped and The most day the same hollow much was essent times branch, and ageenoughly by a like title sambe, which, norwalisms long a fresh pale lilese at the time, even signing a treatly have he ishe. to the term of a colours, and would productly in the mylelaste appreciated in it in fior.

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On the Tlat the fire and mucha were very considerably diminished, but the fest morning they broke out with atill greater this three before. The involve our red, and and of think, the hear at the name there have an interior, lines all oranged the blight the ses ansoled and builded agepriologic. At mother by the mornes of a telescope, eight small operators or formula, all continues a sees beight flame. were thereas on domistion but the port at the wheat companity econoling a large turnary; and, in the other able of the great values there appeared in he or many.

On the morning of the 2.54, the island was much higher then on the prescripty day, and its broadly increased by a channel each which had spring up to the soids to sely little fire almost the water. The new wice also infinite care or it while is dilich tendie which always appropriate when the tiland comed to have reversed any consideral de additions, and mentioned an invalentale tion to mail it was dispersional by

slow wend and townsorts and the state.

The the like of Southenberry, the the expensed amenter some

at the extremity of the Black Island, from which it issued for several days. During that time little was discharged from the large furnace; but from this new passage the astonished spectator beheld the fire dart up three several times to a vast height, resembling so many prodigious skyrockets of a glowing lively red. The following night the sub-aqueous fire made a terrible noise, and immediately after a thousand sheaves of fire darted into the air, where breaking and dispersing, they fell like a shower of stars on the island, which appeared in a blaze, presenting to the amazed spectator at once a most dreadful and beautiful illumination. Tethese natural fire-works, succeeded a kind of meteor, which for some time hung over the castle of Scaro, and which, having a resemblance to a flaming sword, served to increase the consternation of the inhabitants of Santorini.

On the 9th of September, the White and Black Islands united; after which the western end of the island grew daily in bulk. There were now four openings only which emitted flames; these issued forth with great impetuosity, sometimes attended with a noise like that of a large organpipe, and sometimes like the howling of wild beasts.

On the 12th the subterraneous noise was much augmented, having never been so frequent or so dreadful as on that and the following day. The bursts of this subterraneous thunder, like a general discharge of the artillery of an army, were repeated ten or twelve times within twenty-four hours, and, immediately after each clap, the large furnace threw up huge red-hot stones, which fell into the sea at a great distance. These claps were always followed by a thick smoke, which spread clouds of ashes over the sea and the neighbouring islands.

On the 18th of September an earthquake was felt at Santorini. It did but little damage, although it considerably enlarged the burning island, and in several places gave vent to the fire and smoke. The claps were also more terrible than ever; and, in the midst of a thick smoke, which appeared like a mountain, large pieces of rock, which afterwards fell on the island, or into the sea, were thrown up with as much noise and force as balls from the mouth of a cannon. One of the small neighbouring islands was covered with these fiery stones, which being

Constant I state departed they no entercommune thunder was oftened by very governal lachtnages, and at the conmajor the new reland who or endrolls slinker, that met of the origin horizon will shown, and has a burging tooks deere themen to the illamate in two miles and gonerale. The from apprehens, one slow oils to medicular definition from see too meseral days after but me the "little, the toy broke out on terrible, that the chareless of Sommand were some tilled with anythe of popular, appealing rance nominal to be the a last, and the early and hours of Sand addition control dark, that the down and a indown of the Louise flow open, The relation continued to easie don't film remaining parts of the years and it the quartle of languary, 17108, the farry furners, elitical one day's more bound, there are comics and things of lepst ange of rosen, but generally live or we stones a day.

the the title of believery, in the morning, a pretty etrong centhypale was left at Soutenbuy, who is the unlash. finely distributed at a gir- hape to use they communition he the highering adouted a more stone thing there havely for amount the relies the and anote brough in practigants quantities. The shape de obtain risina merre eriticalitest, and all was forma and con-Course I give to all an amounting over property up to a grand tenger above the ware confidence on a ment and botted to with a degree of the payment of the condition of the and erams as hellers my come beard without over me inner and sometimes in loss them a quarter of an best there were the or moun or aparests from the here forms a. Che was of reported classe, the quantity of lance done, who is One of all marries offer the house at higher and has a time to their over homel time, and the time, a big be more opposited ton turn to a super weether and a mountainer they and the configurate

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No. 22 .- St. Michael's Volcano.



No. 23.-Subrina Irland.

We have parent that another apprehens in chands have considered in the except of the Assertion. Then, in the nuclear 17-10, a sendent constructed was determined in the infant of Teneral Ten the relieved against the apprehense and epocked had apprehense the infant of a dop, when attempted to apprehense it is contained and there is a dop to the attempted to apprehense it, contained and in the manifest of the prior of a dop, when attempted to apprehense it, contained a dop, when attempted to apprehense it is a finite prior to the entire that a district. On the apprehense attempted with tenths are contained, with a district the first and present of the entire after contain apprehense a state of the entire the meaning of the contained to the tenth of the entire after contain a many interests of the contained to make the meaning of the entire the another than a many interests of the contained to make the contained to a state of the entire the another than a many interests of the contained to make the contained to a state of the contained to make the contained to the contain

" White in to more engeneral," obtained the author of the greeneding secretary, " time to an then, men andy himse its " may and rol the brokels of the earth, but likewise make " the field a granical draugh the waters at the east. What though to more communicary, or many to our communication O author at Chings, then to absorve the language of the are a time all the a transmitted approve the antique, they procede on wife he organished and despera we also and us on linearies are right to " grantes attended I have that additional time, when " press up to a married paramete, are although almost a mineral O regist, no better as an island's han that this absorbed to dieto see any other and provide a nationar, that the recent in the " are should out be able to promit all and customers there. " time one that, alive they almost began a from and story " aparit mich to mon im whit, the still commit the equipment of an opening it was the mount open habiting the spine to pro-" maner on pristar than may at the to to thill bove is an in-43 Lastra to Rivera Carra, Strongerio, in any prince vale at a "

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been occasioned by an action between two ships, to which cause we universally attributed its origin. This opinion was, however, in a very short time changed, from the smoke increasing and ascending in much larger bodies than could possibly have been produced by such an event; and, having heard an account, prior to our sailing from Lisbon, that in the preceding January or February a volcano had burst out within the sea near St. Michael's, we immediately concluded that the smoke we saw proceeded from that cause, and, on our anchoring the next morning in the road of Ponta del Gada, we found this conjecture correct as to the cause, but not as to the time; the eruption of January having totally subsided, and the present one having only burst forth two days prior to our approach, and about three miles distant from the one before alluded to.

Desirous of examining as minutely as possible a contention so extraordinary between two such powerful elements, I set off from the city of Ponta del Gada on the morning of the 14th, in company with Mr. Read, the Consul General of the Azores, and two other gentleman. After riding about twenty miles across the N. W. end of the island of St. Michaels, we came to the edge of the cliff, whence the volcano burst suddenly upon our view in the most terrific and awful grandeur. (See Plate, No. 22.) It was only a short mile from the base of the cliff, which was nearly perpendicular, and formed the margin of the sea; this cliff being, as nearly as I could judge, from three to four hundred feet high. To give you an adequate idea of the scene by description, is far beyond my powers; but for your satisfaction, I shall attempt it.

Imagine an immense body of smoke rising from the sea, the surface of which was marked by the slippery rippling of the waves, occasioned by the light and steady breezes incidental to these climates in summer. In a quiescent state, it had the appearance of a circular cloud revolving on the water like a horizontal wheel, in various and irregular involutions, expanding itself gradually on the lee side, when suddenly a column of the blackest cinders, ashes, and stones would shoot up in the form of a spire, at an angle of from ten to twenty degrees from a perpendicular line, the angle of inclination being universally to windward; this was rapidly succeeded by a second, third, and fourth shower,

with the Witten water the history of their Title of the combine printing printer value by, and complexing the object the three had attained on attende as much amount the first of an eye, on the majors before the

As the imposes with which the entours were correctly posted if described, and the is a cutting restant and are a transaction of the entoury at place a time again training themselves into termine of white heathers emisted training themselves into termine of white heathers emisted, in the most formal immediation, places, between the min the times period of numerical places of their entouries the appearance of numerical places of their entouries the places of their entouries the distance of manufactures of their entouries that is also become manufactures of their entouries that of the limit energy training to the entouries of the limit energy training and the entouries of the entouries of the entouries of the entouries and the entouries of the entouries without the entouries of a very line without

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most magnificent bursts took place which we had yet witnessed, accompanied by a very severe shock of an earthquake. The instantaneous and involuntary movement of each was to spring upon his feet; and I said, "This admits of ne doubt." The words had scarcely passed my lips, before we observed a large portion of the face of the cliff, about fifty yards on our left, falling, which it did with a violent crash. So soon as our first consternation had a little subsided, we removed about ten or a dozen yards further from the edge of the cliff, and finished our dinner.

On the succeeding day, June 15th, having the Consul and some other friends on board, I weighed, and proceeded with the ship towards the volcano, with the intention of witnessing a night view; but in this expectation we were greatly disappointed, from the wind freshening, and the weather becoming thick and hazy, and also from the volcano itself being clearly more quiescent than it was the preceding day. It seldom emitted any lightning, but occasionally as much flame as may be seen to issue from the top of a glass-house or foundry chimney. On passing directly under the great cloud of smoke, about three or four miles distant from the volcano, the decks of the ship were covered with fine black ashes, which fell intermixed with small rain. We returned the next morning, and late on the evening of the same day I took leave of St. Michael's to complete my craize.

On opening the volcano clear of the N. W. part of the island, after dark on the 16th, we witnessed one or two eruptions that, had the ship been near enough, would have been awfully grand. It appeared one continued blaze of lightning; but its distance from the ship, upwards of twenty miles, prevented our seeing it with effect. Returning again towards St. Michael's, on the 4th of July, I was obliged, by the state of the wind, to pass with the ship very close to the Island, which was now completely formed by the volcano, being nearly the height of Matlock High Tor, about eighty yards above the sea. At this time it was perfectly tranquil; which circumstance determined me to land, and explore it more narrowly. I left the ship in one of the boats, accompanied by some of the officers. As we approached, we perceived that it was still smoking in many parts, and, upon our reaching the island, found the surf on

the treate may high. Receive enters in the less distribution of the unit of an one, as a policy of images on claim, but the unit of an one, as a policy of images on claim, and one followed by the other offices. We freque a near care from least likely exist, from which it had not the claim when in personal massers to mission of an anomaling; and where we could have visitely of the passes of matter what much that had no allow our proposed opportunity than a few years in the new-oil

The destricts below the author of the am was equally comp, having exemplathere exemple in enterly the bond's benefit from the phote, and at the channel of themy within your we manufall exemply be fortuned from welfing exemple to manufally be about a mile to electron trace has the amountainty has shown mile to electron trace. In the mine extraordinary pact was the reason, the month of which, on the white having No. Maharita, as been found in which, in the white having No. Maharita, as their time with my, and was complying itself with twiter, at their time with my, and was complying itself that the water, at their time with my, and was complying itself that the water, it from the water at the complete of the area, who colors, it may be adont to the retty of the area, was so lart, in only to adome the finger in the dispersionalization to, and taken out a mine animal animals in the dispersionalization of a taken out a mineral animals of the second of the dispersional animals of the animals animals of the

It approximate enthous, by the transation of this just a this obtaint, that the so lead, dividing the countries, to choose that the context in two places, so the east else of the most enter the context in two places, so the east else of the most enter the bounds and there are transactional object y for the his bounds a personal of alternative countries of the charge the countries of the charge the time enterpole with the other pure of the reliant by a rate row or the of context and have no one retirement of transactions, and the other part of the reliant of the rate of the standard of the countries of the first transaction. It was substituted in the form of an applicationary.

The cittle it two or three miles decrease from the Helman, but its upper countries at each of any accounting a could fare or think borne. The typing the we were the remained, if possible to attent, but no althought we had to encounter its during as was considerable to the only may resistants it was up the able of the estimate it for each was an analytic the raty meet by which we could observe the page by a ring the end of sures at the time, which the could observe it which we force the end of sures at the time, which the countries of the time and the end of sures at the time, which we have the end of sures and the time, which we have the end of sures and the time.

Having reached the summit of the isthmus, we found another difficulty; for it was impossible to walk upon it, as the descent on the other side was immediate, and as steep as the one we had ascended; but by throwing our legs across it, as would be done on the ridge of a house, and moving ourselves forward by our hands, we at length reached that part of it where it gradually widened itself, and formed the summit of the cliff, which we found to have a perfectly flat surface, of the dimensions before stated. Judging this to be the most conspicuous situation, we here planted the Union, and left a bottle sealed up, containing a short account of the origin of the island, and of our having landed upon it, and naming it Sabrina Island. (See Plate, No. 23.)

Within the crater I found the complete skeleton of a guard-fish, the bones of which, being perfectly burnt, fell to pieces upon attempting to take them up; and, by the account of the inhabitants on the coast of St. Michael's, great numbers of fish had been destroyed during the early part of the eruption, as large quantities, probably suffocated or poisoned, were occasionally found drifted into the small inlets or bays. The island, like other volcanic productions, is composed principally of porous substances, generally burnt to complete cinders, with occasional masses of a stone, which I should suppose to be a mixture of iron

and limestone.

Sabrina Island has gradually disappeared, since the month of October, 1811, leaving an extensive shoal. Smoke was discovered still issuing out of the sea in the month of February, 1812, near the spot where this wonderful phenomenon appeared.

SUBTERRANEOÙS WONDERS.

THE GREAT KENTUCKY CAVERN.

Give me, ye powers, the wonderous scenes to show, Conceal'd in darkness, in the depths below.

FOR a very interesting account of this stupendous cavern, which is unparalleled in the history of subterraneous wonders, we are indebted to Dr. Nahum Ward, who published it in the MONTHLY MAGAZINE of October 1816. It is situated in Warren County, and in a territory not moun-

comment and brokens although in this events it in the tillion saverno littlistes knowns. The Designs, formations with another, two large lamps, a company, and principal maple. descended a job larry teer to depth, and one hundred and tiveney in electronements; business spelay or time water at the Indiana, and comparing the the exception of the car principal The agreement, which is to the morning is finer force to fifty fact leads, about thirty he writtle. It receives sharply attent, but nowing appropriate to a worldly of thirty on busts to-1. and a feel, let of two my constraining there Minimumon by about a mile, so the Grat hoppers," where a manufacturer of collegence has recently from englishment. The protect the way and of these hoggers, two miles trong the entenner, it is his twitter in wollde, and sixts to helpfit. Throughout nearly the whole of the distance bendance walls have been made by the manufacturing, of the boxe fore-stone i. The real is burd, and as someth as a thought varietit. The exery passage which then then the transport of the expected ground more returning and the arches, which lave hist dellanges on a to enthaportee, and or what. In 1803, when the heavy Grante as environment many not which were mach with tell in this part of homeonics, the workings stationed at the onin tensive a martiding power more from the caste, like a strongappeared to be industrial information to first describing-Marshar, menne me injured, although lover partiene or rach sell in altiforeme passe on the ensures.

In advances for the course, the avenue heads from the second hopper, west, one miles and through another entitlement, and homes, in the class of the which is an index from the or fone; I file avenue, throughout he whale cannot make he done to the consecute, so short arm, is from each nearly on a larely the theory in parties with here increase, and mippersonal marks the form, is I reached the form one arms or distribute the first and the first are arms or distributed to the first open and the form one arms or distributed to the first and the first arms of the first and the first arms of the first and the first arms of the first arms of the first and the first arms of the

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THE GREAT KENTUCKY CAVERN.

fas

conducted them to within the walls at the fourth rity. It is not inferior to the second, having an arch which covers at least six serves. In this last avenue, the extremity of which cannot be less than four niles from the chief city, and ten from the mouth of the cavern, are upwards of twesty large piles of sale-parte earth on the one side, and traken lime-stone leaged up on the other, evidently the work of humburhands.

From the course of his needle, the Doctor expected that this avenue would have led circuitsusly to the chief city; but was much disappointed when he reached the extremity, at a few handred yards distance from the faurth city. In retracing his steps, not having paid a due attention to mark the entrances of the different avenues, he was greatly bewildered, and once completely lost himself for arealy fifteen or eventy minutes. Thus, faint and wearied, he did not reach the chief area till ten at night : but was till determined to explore the cavern so long as his light should last. Having entered the fifth and last avenue from the chief area, and proceeded south-east about nine hundred yards, he came to the lifth area, the arch of which covers upwards of four acres of level ground, strewed with lime-stones, and having fire-beds of an uncommon size, surrounded with brands of came, interspersed. Another avenue on the opposite side, led to one of still greater capacity, the walls or sides of which were more perfect than any that had been nonced, ranging almost due south for nearly a mile and a half, and being very level and straight, with an elegant arch. While the Ductor was employed, at the extremity of this avenue, in sketching a plan of the cave, one of his guides. who had strayed to a distance, called on him to follow. Leaving the other guide, he was led to a vertical passage. which opened into a chamber at least 1500 feet in circumference, and the centre of the arch of which was 150 feet in height.

It was past midsight when he entered this chantler of creand darkness; and whose he refflected on the different avenues through which be had passed since he had penetrated the caved eight into the morning, and now found himself her els event mides in the dark recessors of this awful vavenuthe grave, perhaps, of thousands of himsun beings—the felts a three in horror. The avenue, or passages, which led



festooned in the most function monter, for six or eight feet from the hanging, and in colours the most rich and brilliant. By the reflection of one or two lights, the columns of spar and the stalactices have a very romanic perarmice. Of this spar a large cellar, called "Wilkins armed clastir," has been formed in the centre of the avenue, and entiried with many smaller ones. The columns of spar, futted and studied with knots of spar and stalactice; the drapery of various colours superbly festioned, and hang in the uses graceful manuer; these are shown with the greatest brillhare by the reflection of the larges.

In the vicinity of the "haussed chamber," the samed of a cataract was heard; and at the extressity of the avenue was a reservoir of water, very clear and grateful to the taste, apparently having neither inlet nor outlet. Here the sit, as is many other parts of the cave, was pure and delightful. Not far from the reservoir, an avenue presented itself, within which were several columns of the most brillant gar, sixty or seventy feet in height, and almost permanents, standing in basins of water; which, as well as the columns, the Doctor observes, surpass, in splendour and remuty, every similar work of art he had ever seen.

Returning by a heautiful pool of water, the Doctor came to the second hoppers, where he had found the nummy before alluded to. It had been removed from another cave, for preservation, and was presented to him by his friend Mr. Wikins, together with the apparel, jewels, music, dec. with which it was accompanied. It has since been placed in the Washington runceum, the proprietor of which thinks it probable that this minimy is as ancient as the immensionated of the western country, which have so much atomished the world.

GROTTO OF ANTIPAROS.

|Ser Plate, No. 21.4

ASTIFADA, ONE O'THE Cyclindes, is alturated in the Algemasee, in Greaton Archipelago. It is a spanl island, about distern miles in circumforease, and first two miles to the sees of the cyclebrane Parrs, from which circumstance deriver its owne, and in the Greek longuage signifying appoint to. Its singular and most interesting grouts, though so inferior in size to the cavers in Kentucky, he-

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GROTTO OF ANTIPAROS.

41

the magaificent grotto, to procure a sight of which he has endured so much fadigue. It is in width three hundred and sixty feet; in length three hundred and forty; and in most places one hundred and eighty in height the had of srochight, he finds himself beneath an immens? and finely-waulted arch, overspread with icicles of white shining marble, many of them ten feet in length, and of a proportionate thin exist. Among these are suspended a thousand festoons of leaves and flowers, of the same substance, but so glittering as to dazule the sight. The sides are plasted with petriactions, also of white marble, representing trees; there is in rows one above the other, and often enclose the points of the icicles. From them also hang festoons, tied as it were one to another, in great abundance; and in some places rivers of marble seem to wind through them. In short, these petrifactions, the result of the dripping of water for a long series of ages, nicely resemble trees and brooks turned to marble. The floor is paved with crystals of different colours, such as red, blac, green, and yellow, projecting from it, and rendering it rugged and uneven. These are again interspersed with icicles of white marble, which have apparently fallen from the roof, and are there fixed. To these the guides fasten their torches; and the glare of splendor and beauty which results from such an illumination, may be better conceived than described.

To the above lively description we subjoin an extract from the one given by Dr. Clarke, a learned traveller, who visited this celebrated grotto in 102.

"The mode of descent is by ropes, which, on the diferent declivities, are either held by the guides, or are
joined to a cable which is fastened at the entrance around
a stalactie pillar. In this manner, we were conducted, first
down one declivity, and then down another, until we entered the spacious chambers of this truly enchanted grotto.
The roof, the floor, the sides of a whole series of magnificent caverns, were entirely invested with a dazzling
incrustation as white as snow. Columns, some of which
were five-and-werety feet in length, pended in fine icide
forms above our heads: fortunately some of them are so
far above the reach of the nunerous travellers, who during
many ages, have visited this place, that no one has been
able to injure or remove them. Others extended from

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and four fr i wide. "This gradue is none regular to no three, and is about thirty one in dimension, and morely round; the bright to from five to or, but. It is very rights and tenestrally about the four to the crying forms of the statement harging. The floar to the covered with a new and alignment planting, to which ensured tooth and power appears to have been found.

From this gently manuscropy the descent in the interferences. Within only about five us at two its equation in the flows is seen, which is partly realised over by a properties present over the about twenty from This cover is about thirty form in height, about them two its orbits, and granty circular; the disease rank, and dearly circular; the disease rank, and the disease carb, the artificial properties of unknown, and the flows carbon twenty is not reverse that a loose earth, the artificial result at animal decomposition, and in which improves hours over indexpired.

A gradual descent leads to another gradu, which, with the penanture, to larger frost in longith, and recently hert to tometry. Its miles and time are bountifulty admined with stalm tites. Nearly twenty feet further is a trightful well, the operation of which is about between fore in elementer; and, upon threending about twenty lect, another group, them the same allameter with the juggers, but deep feet in botability to seem. There the boom are illengrated allow : used the floor, which to horself of approal earth, has great munities at them turbodiled in it. The bures named age home much ween to be of different promote; but to this, or well to be the heart saverns, perfect and unherken house are very sublina finant. Sometimes a both is easy proto may from the with such, through the malactitic coverin, shooting that ment of these wonderful remains may have to conveyed a specimen of this kind has been process to sail to endowed pertinularly lunescentians, by the mos mides result of the lower jew, with his enamed quite product, ching threagh the staterilite mass which imposes plus frame. In this current the understess fundin to be of a targer area, and to a more ediment form

Parally is themselventiers uponing to the real, samuelled the last time, and the other little, last to repeat a similar to the last time and the contract to the last time and the contract to the last to the last time and the last time and the last time.

114 CAVERNS IN GERMANY AND HUNGARY.

height, and about half as much in its diameter, in which is a truncated columnar stalactite, eight feet in circumference.

A narrow and most difficult passage, twenty feet in length, leads from this cavern to another, five-and-twenty feet in height, which is every where beset with teeth, bones, and stalactitic projections. This cavern is suddenly contracted, so as to form a vestibule of six feet wide, ten long, and nine high, terminating in an opening close to the floor, only three feet wide and two high, through which it is necessary to writhe, with the body on the This leads into a small cave, eight feet high and wide, which is the passage into a grotto, twenty eight feet high, and about three-and-forty feet long and wide. Here the prodigous quantity of animal earth, the vast number of teeth, jaws, and other bones, and the heavy grouping of the stalactites, produce so dismal an appearance, as to become a perfect model of a temple for a god of the dead. Here hundreds of cart-loads of bony remains might be removed, pockets might be filled with fossil teeth, and animal earth was found to reach to the utmost depth to which the workmen dug. A piece of stalactite, being here broken down, was found to contain pieces of bones, within it, the remnants of which were left imbedded in the rock.

From this principal cave is a very narrow passage, terminating in the last cave, which is about six feet in width, fifteen in height, and the same in length. In this cave were no animal remains, and the floor was the naked rock.

Thus far only could these natural sepulchres be traced; but there is every reason to suppose, that these animal remains were disposed through a greater part of this rock.

Whence this immense quantity of the remains of carnivorous animals could have been collected, is a question which naturally arises; but the difficulty of answering it appears to be almost insurmountable.

THE GROUPA DULL CAN-

Tutte name but here given by a small correct between Notice and Possend, on they greened, there it a rive to brought into it, and his own hald to the ground, a difficulty in the partition interest of the partition all managers in and over his, if he he am quantily annua tings were all. There are wher granters endeaved olds the mule did to come menter, especially in reduction countries, and the pre-Otherian vaginary show exhab are epitable faint lands to him made and man divergly they she can olive to the can the elighten tooks after at their presents. The evapours need homeson, for the presser part marginging while this of the law is a new Users to purportual, and some to have grammed the thoully effects owner to the three of Plany. . . . town Al resting erest worken down and suffer from it, the negligio trasser ci-tre to a quali heapter into principle counted to may, theme men, the entered might my decrees

The surface of a purch corresponded in aids various, in your views the determined, measures a relation dains and powers as at the bottom of the close. The resourced this of that the interest with a good than each travelle with the good than each the accomplishment as I am there impressed, that the radial product of the the control of the dains appropriately. Out the radial product of the dains appropriately that the control of public dails also to be a full than the are supposed to the control of the dains and the full than the are supposed to the day of the control of the day of the area of the day of the area of the day of the area of the area of the day of the area of the day of the area of

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GROTTS DEL CANE.

117

The water near its banks is no lapper seen to bubble up, from the disengagement of a gas, as it appears from accounts not of very remote natiquity, to have done. horders of the lake were attentively examined by the Vube, when its waters were at the highest, and after heavy rains; but he could never discover a single hubble of air. A number of squatic baseds which sport on the surface, may at first sight occasion some deception; but a slight observation soon detects the error. It, therefore, we do not suppose those authors who have described the ebullition of the water near the banks of the lake Agmino to have been deceived, it must at least be confessed, that this phenomenon has now ceased. The quantity of the solphoreous vapours which rise in the contiguous stoves, called the stoves of St. Germano, must likewise he grently diminished from what it anciently was: for, adjaining to the present stoyes, we still find the remains of a specious aneacht fabric, with tubes of terra cotta reserted in the walls. which, by their direction, show for what purpose they were intended. It appears certain, that this was a building in which by the means of pipes properly disposed, the yepours of the place were introduced into different rooms. for the use of patients. To these rains, however, the s mones no longer extent; so that, it this editice had remakend entire, it could not have been employed for the purpose for which it was intended. The votes of pyrites which produced the more ancient conductations of the Phlegrean fields, between Naples and Cume, and which, in some places are entirely consumed, approach their total extustion. To proceed to the experiments within the

The object of the first was to determine the height of the neghtine rapport at the centre of the gratte, that is, the intersection of the line of its greatest length with that of its greatest breadth. This height writes according to the different dispositions and temperatures of the atmosphere, the diversity of winds, and the accidental various which take place in the internal formentations by which the vapour is produced. It may, however, be estimated, at a area, at veryly one English inches.

The second set of experiments regarded the degree of best on entering into the menhitist in one slightly sensiblized by

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THE GREAT CAVERS OF OUALHARD

IN PRINTEL AMERICA

In a country where the question of a rows, and is indicated to thousands of motion of feets, the lat of which is indicated to the highest motion of motion of the highest man desired to the highest man decreased to the highest man decreased to the highest of the manufacture and decreases. Annually has a company quicked of Communication in a relation the stand of the chief. That is the first man of Arabic for the stand of the chief. The first standard for the chief. The first standard in the first standard in the contract of the standard in the contract of the standard in the contract of the standard for the contract of themse.

The Carra del Imeriana to present he the vectoral prothe or a root. The entrance to surgard the weath, and forms a coult cighty but beaut, and accenty-two but The rock, that commounts the grate, is covered and there is a proposed began. The managed-treet, and the gampa with turn and whining leaves, rules thele transfer vertically amounts the sky; while those of the combact and the organization forms, as they recould them street, a think engle of evertage. Plants of the family of graphic with on colour atoms, analisms, and melinber of a simples execution, time in the direct elittle of the contrawhile grouping plants, was lon in the winds, are laterage was by forecaster before the opening of the except, We dis-Merculation in their immunion a highwale of a violes tiles, the purple desiches, and for the first time time assentioned elinples, the amuse dower of which has a fleshy title more their mittanches long. The entraines of grounds, like the stow of couractes, the last that partie deal a lorger ferring the eff. maxime more in his impostic, in which along one planets and which in amore sort departments the character of the Wifers a continue between the times of Coripe, and then owners of the North supered with make and sharpy fairleanned?

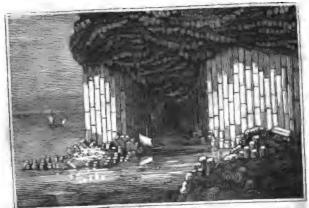
that this beauty of very interest embellished and only the contains at the vanit, it appears come in the validate of the proofs. We saw with arranglelession plantate bravel hele-course anything to be bright, the proofs pullishers, and where

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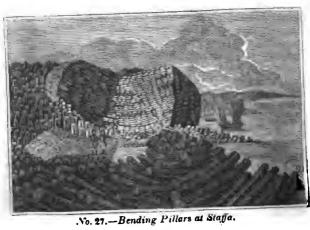
escent arums, follow the banks of the river even to those subterranean places. The vegetation continues in the cave of Caride, as in those deep crevices of the Andes, half excluded from the light of day; and does not disappear, till, advancing into the interior, we reach thirty or forty paces from the entrance. We measured the way by means of a cord: and we went on about four hundred and thirty feet, without being obliged to light our torches.

Day-light penetrates into this region, because the grotto forms but one single channel, which keeps the same direction from south-east to north-west. Where the light begins to fail, we heard from afar the hoarse sounds of the nocturnal birds, sounds which the natives think belong exclusively to those subterraneous places. The guacharo is of the size of our fowls, has the mouth of the goatsuckers and process, and the port of those vultures, the crooked beak of which is surrounded with stiff silky hairs. It forms a new genus, very different from the goatsucker by the force of its voice, by the considerable strength of its beak, containing a double tooth, by its feet without the membranes that unite the anterior phalanxes of the claws. In its manners it has analogies both with the goatsuckers and the alpine crow. The plumage of the guacharo is of a dark bluish-grey, mixed with small streaks and specks of black. It is difficult to form an idea of the horrible noise occasioned by thousands of these birds in the dark part of the cavern, and which can only be compared to the croaking of our crows, which, in the pine forests of the north, live in society, and construct their nests upon trees, the tops of which touch each other. The shrill and piercing cries of the guacharoes strike upon the vaults of the rocks, and are repeated by the echo in the depth of the cavern. The Indians shewed us the nests of these birds, by fixing torches to the end of a long pole. These nests were fifty or sixty feet high above our heads, in holes in the shape of funnels, with which the roof of the grotto is pierced like a sieve. The noise increased as we advanced, and the birds were affrighted by the light of the torches of copal. When this noise ceased around us, we heard at a distance the plaintive cries of the birds roosting in other ramifications of the cavern. It seemed as if these bands answered each other alternately.





No. 26. - Fingal's Care.



The landers over him the Control of Considers used as an enter control of the police, his intense of which they are any the present part of the mate. At the control of they are the mate and the all the a, to the real fluid and the all the a, to the real fluid fluid fluid the property of the fluid of the control of the fluid of the fl

We fulliament, as see marchined our personne discount there every, the house of the rated that which moved from h. and a flow twenty elett in thirty are note . We eather one that founds, we let see the both correct of Other seconds in emissione propertied in. When the restors a lack energy were he to increase of realistation, we were colline makes of the desired error to but, which to east own that he deput The lower party engineer, then this emberroaments trades to the central of the river of migra, which, at a sen language allel many what I making publical alice annually every of married Marie is surrentile for execute. If include their the these Arramation the more of Coppens do Towers. We loved on the marks of the adnorraneous should a great spansity of principle and the complete of transaction of which the Tradition alight to sends the owner length to the reals of the execution. The energy featured by the everyone of the calif Processable of the trust a burnante on to were the fourtaining of a laction morn attendants plantel.

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souls of their ancestors sojourn in the deep recesses of the cavern. "Man," say they, "should avoid places which are enlightened neither by the Sun nor by the Moon." To go and join the guacharoes, is to rejoin their fathers, is to die. The magicians and the poisoners perform their nocturnal tricks at the entrance of the cavern, to conjure the chief of the evil spirits.

At the point where the river forms the subterraneous cascade, a hill covered with vegetation, which is opposite the opening of the grotto, presents itself in a very picturesque manner. It appears at the extremity of a straight passage, 240 toises in length. The stalactites, which descend from the vault, and which resemble columns suspended in the air, display themselves on a back-ground of verdure. The opening of the cavern appeared singularly contracted, when we saw it about the middle of the day, illumined by the vivid light reflected at once from the sky, the plants, and the rocks. The distant light of day formed somewhat of magical contrast with the darkness that surrounded us in those vast caverns. We climbed, not without some difficulty, the small hill, whence the subterraneous rivulet descends. We saw that the grotto was perceptibly contracted, retaining only forty feet in its height; and that it continued stretching to the northeast, without deviating from its primitive direction, which is parallel to that of the great valley of Caripe.

The missionaries, with all their authority, could not prevail on the Indians to penetrate farther into the cavern. As the vault grew lower, the cries of the guacharoes became more shrill. We were obliged to yield to the pusillanimity of our guides, and trace back our steps. We followed the course of the torrent to go out of the cavern. Before our eyes were dazzled with the light of day, we saw without the grotto, the water of the river sparkling amid the foilage of the trees that concealed it. It was like a picture placed in the distance, and to which the mouth of the cavern served as a frame. Having at length reached the entrance, and saated ourselves on the bank of the rivulet, we rested after our fatigues. We were glad to be beyond the hoarse cries of the birds, and to leave a place where darkness does not offer even the charms of silence

and tranquility.

DRAME STAPPS CAVIDRY:

TO PINIONAL'S DAYS.

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the section of the terms to the companies of the section of the terms, the whole of the terms of the whole of the terms of the whole of which of which the terms the terms of the terms of

Person, stand over miles N. R. R. of Jums and constraint and successful the above of Mall, about our mile to for its, and but a talle to forealth, is need for the best public oblich apparet the course part of the Island, and for the jumper of the latent, and for the jumper of a person to other fed by the Cove of

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who the read with at South to a small law, the spin when the term to hand the thin simplification because the great

group of pillars; they are small, and instead of being placed upright, are recumbent on their sides, and form a segment of a circle. Further on is a small cave, above which pillars again are seen, of somewhat larger dimensions, which incline in all directions; in one place in particular, a small mass of them much resembles the ribs of a ship. Beyond the cave is the first continued range of pillars, larger than the former, and opposite to them is a small island called Bhuachaile, (pronounced Boo sha-'lay,) or the Herdsman's Isle, separated from the main by a channel not many fathoms wide. The whole of this islet is composed of pillars without any strata above them; they are small, but by much the neatest formed of any in this quarter.

The first division of this islet, for at high water, it is divided into two parts, makes a kind of cone, the pillars converging together towards the centre. On the other side the pillars are in general recumbent; and in the front, next the main, the beautiful manner in which they are joined is visible from their even extremities; all these have their tranverse sections exact, and their surfaces smooth; but with the larger pillars the reverse is the case, and they

are cracked in all directions.

The main island opposite the Boo-sha-lay, and thence towards the north-west, is entirely supported by ranges of pillars, pretty erect, which, although not apparently tall, from their not being uncovered to the base, are of large diameter; at their feet is an irregular pavement, made by the upper sides of such as have been broken off. This extends as far under the water as the eye can reach.

In proceeding along the shore, the superb cavern of Fingal appears, for such is the denomination given it by the Highlanders, to whom it is known. It is supported on each side by ranges of columns, and is roafed by the bettoms of such as have been broken away. From the interstices of the roof a yellow stalactitic matter has exuded, which precisely defines the different angles; and, varying the colour, tends to augment the elegance of its appearance. What adds to the grandeur of the scene, the whole cave is lighted from without, in such a manner, that the fartherest extremity is plainly distinguished; while the air within, being constantly in motion, owing to the flux and

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sticking in it, as if half immersed. The base, when broken appears to be composed of many heterogeneous parts, and much resembles lava. Many of the floating stones are of a similar substance with the pillars, a coarse basaltes, less beautiful than that of the Giant's Causeway: the colour is a dirty brown. The whole of this stratum dips gradually to the south-east.

The thickness of the stratum of lava-like matter below the pillars, the height of the pillars, and the thickness of the superincumbent stratum at three different places westward of the mouth of the cave, beginning with the corner pillar of the cave, are described as under by Sir Joseph

Banks.

	Feet.	In.	Feet.	In.	Feet.	In.
Stratum below	11	0	17	1	19	8
Height of pillars	54	0	50	0	55	1
Stratum above	61	6	51	1	. 54	7

The Stratum above the columns is uniformly the same, consisting of numberless small pillars, bending and inchning in all directions, sometimes so arregularly, that the stones can only be said to have an inclination to assume a columnar form; in others more regularly; but never breaking into, or disturbing the stratum of large pillars, whose tops keep every where an uniform line. On the opposite side of the island is a cavern, called Oua-nascarve, or the Cormorant's cave; here the stratum under the pillars is lifted up very high, and the pillars are considerably less than at the north-west side. Beyond, a bay cuts deep into the island, rendering it not more than a quarter of a mile across. On the sides of this bay, especially beyond a little valley, which almost divides the island, are two stages of small pillars, with a stratum between. exactly resembling that above, formed of innumerable little pillars shaken out of their places, and leaning in all directions. Beyond this, the pillars totally cease. The rock is of a dark-brown stone, without regularity, from the bay along the south-east end of the island; beyond which, a disposition to columnar formation is again manifested, extending from the west side, but in an irregular manner, to the bending pillars first described.

OFFILER GROTTO AS AND CAVERSS.

Those we for countries which have not to beaut of a raciony of partoral expansionary and these barn, from them. extend, stone time, and the crainin phenomena they exhibit in the terresonant of perplactions, die being as all plans abterm of magnifer attentions. Among these particularly de-

serving of suits a are the tollowing .

The rub mate timulary bandering in Roller to proudurly disential by antonia cartines of your extent and contess. on which first account it is related by Seneca, that the Remana were accustomed to erect seats in their richuty, to equip their refreshing abilliness in the summer session. gives a portle-thr account of two each grottons belonging to the cills of Vitta; and it was in a place of this work that Tilprain you nearly Jestroved while at suppose he and authority gave way, and buried saveral of his allend one in the group; which we also used the others, that the that and alumbated the emperor, with the execution -Benning, who, changing on his bands and knees, and copring the besty of Tiberius with his own, received all the come which this at that part trous the scot, immunish that, although he blowell auctioned considerable injury: the conperson announced unburn

The Courses of the Covernor Mountains, in Lance Languedes, are both manerous and executive. The prinsignal case to man in he replaced without much preconting, and a them a san gable. The entrance, which is have and maroun, hours no a spine thing amphilithringer, the actetime transhanging from the root of which have a most apleaded to for hy the helpf ill markers. Hence the visitor has to do would be several eliaminers, one of relactive named the t tember of the Whide, another, of Echo; another, of the Consider another, and an of the Statue, Are, I on accuses of their coldbining then different phenomena. more of Valori, or a world distance, the deferred milital currentities where are in the found at every step, may be spenial at letouce, and without assertionating as the violate never hims stylet of the light at the entrance, and to these turn, not make any devad of reducining in battery. Here he to matthest by a fine of the more standar perplications

representing flowers, fruits, bee-hives, and, in short, a variety of objects, in many of which the resemblance is nearly

as accurate as if they had been sculptured.

In a wood, about five leagues from Besancon, in the province of France, called Franche Comte, an opening. formed by two masses of rock, leads to a cavern more than nine hundred feet beneath the level of the country. It is in width sixty feet, and eighty feet high, at the entrance, and exhibits withinside an oval cavity of one hundred and thirty-five feet in breadth, and one hundred and sixty-eight in length. To the right of the entrance is a deep and narrow opening, bordered with festoons of ice. which, distilling in successive drops on the bottom of the cavern, form a mass of about thirty feet in diameter. similar one, but somewhat smaller, produced by the water which drips in less abundance from the imperceptible fissures in the roof, is seen on the left. The ground of the cavern is perfectly smooth, and covered with ice eighteen inches thick; but the top, on the outside, is a dry and stony soil, covered with trees, and on a level with the rest of the wood. The cold within this cavern is so great, that, however warm the external atmosphere may be at the time it is visited, it is impossible to remain in it for any continuance.

These natural ice-houses are not unfrequent in France and Italy, and supply this agreeable luxury at a very cheap rate. Thus, in the same province, in the vicinity of Vesoul, is a cavern which, in the hot season when it is eagerly sought, produces more ice in one day than can be carried away in eight. It measures thirty-five feet in length, and in width sixty. The large masses of ice which hang pendent from the roof, have a very pleasing effect. When mists are observed in this cavern, they are regarded by the neighbouring peasantry as infallible prognostics of rain; and it is worthy of observation, that although the water in the interior is always frozen in the summer, it becomes liquid in the winter season.

A grotto near Douse, also in Franche Comte, forms a similar ice-house, and is remarkable on account of the various forms of its congelations, which represent a series of columns, sustaining a curious vault, which appears to be

carved with figures of men, animals, trees, &c.

The caverno of Gillimites are numerous, and several pewhen all ution is called M. Michael's Care, separated on the englishs part of the amounting. The engineer is into those sand test above the level of the eng, and beformed by a and which books to it specimes built, successed with some cost amparently improved to the centre by a large malarty cal pilliar. To this ancessels a long series of some, of diffcall arrows. The provides leading from the are in the either not record possibless, which cannot be passed without the gest of ergo and making building Surveyed at the career upon them hamiltoned to be become the enquery many there at the depth the another of the toroles carried in the makes to more so dissuppossed that the sister is obtained endance notice to offer his the persons, and heave other envise menplaned. In these is anything amounting, the process and he multing of the epilarities of the beamond, from the flux guilfellibe come empounded from the read to the entires trigh of a pillar, three feet in discreme, which then trumthe flow, and seems invended by motion to improve the ermi termi which it m (grant-).

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cavation is divided into several large halls, and other apartments. The vast number of pillars by which it is ornamented give it a superb appearance, and are extremely beautiful: they are as white as snow, and have a semitransparent lustre. The bottom is of the same materials; insomuch that the visitor may fancy he is walking beneath the ruins of some stately palace, amid noble pillars and columns, partly mutilated, and partly entire. Sparry icicles are every where seen suspended from the roof, in some places resembling wax tapers, which, from their radiant whiteness, appear extremely beautiful. All the inconvenience here arises from the inequality of the surface, which may make the spectator stumble while he is con-

templating the beauties above and around him.

In the neighbourhood of the village of Szelitze, in Upper Hungary, there is a very singular excavation. The adjacent country is hilly, and abounds with woods, the air being cold and penetrating. The entrance into this cavern, fronting the south, is upwards of one hundred feet in height, and forty-eight in breadth, consequently sufficiently wide to receive the south wind, which here generally blows with great violence; but the subterraneous passages, which consist entirely of solid rock, winding round, stretch still farther to the south. As far as they have been explored, their height has been found to be three hundred feet, and their breadth about one hundred and fifty. The most inexplicable singularity, however, is, that in the midst of winter the air in this cavern is warm; and when the heat of the sun without is scarcely supportable, the cold within is not only very piercing, but so intense, that the roof is covered with icicles of the size of a large cask, which, spreading into ramifications, form very grotesque figures. When the snow melts in spring, the inside of the cave, where its surface is exposed to the south sun, emits a pellucid water, which congeals instantly as it drops, and thus forms the above icicles: even the water which falls from them on the sandy ground, freezes in ah instant. It is observed, that the greater the heat is without, the more intense is the cold within; so that, in the dog-days, every part of this cavern is covered with ice. In autumn, when the nights become cold, the ice begins to dissolve, insomuch that, when the winter sets in, it is no longer to be con, the covery there is productly they, and then a make construct. It is, there there, and competitive that covering up filling points, there, on to, and even areas acquired to the form and harms, reserved thillier, as not have upperly and remain there and the return of opening.

THE VANAR.

OR PROPERTIES. TINE.

CATTAIN BY DEPOSIT, of the coyal Navy, F. R. S. among the himsecolog details of his bigs survey of Bourgrandin, of the dough cours at Asia Bliner, describes this expense phenomenous and from his executes the talkening particulate are estimated, as supplicated any in the simple details of telegrapes allowed processing the state simple details of telegrapes allowed processing the state of the simple details of telegrapes and the simple details of telegrapes allowed processing the simple details of telegrapes and telegrapes are simple details.

thorney pursue word chiefly this night a small but stoudy tight among the fills, this was represented by the infinite builts on a presere, no make more light posted on the following Kausting warmedy bot know to want the epol. In the from countries and not harling by man to a wall, so notice mental as in leave on aperture of about them but in dianaorner, and designed like the mouth of an even. I came this questions the Binne mount, giving our an interior heat, but without preside tage may another in the wall, and although covariable and a second and were detailed from the ren & of the opening, the wills were observed the about. Time, innotermal, and weeds, green these around this little exalter a a made one and tried but those the fall in his entirely a and the ground and and appear to and the effect of its limit. of more thoughten parteculation. Not any subsceptioners durations were to be provided courted; but it a short drawing, book down on the side of the bill, was applied linds an appropriate, which had apparently have at amore rename period the very in a smaller flame. If was mountainly Incorporate the grade, that the measury of the for and case of intrabiliants, there land there has nice with videants expectation, used that the oran and approximate heal harm rolls startly the sup the whiled, that it was more normalizations by corthopather a maker and that it that aport either chains arrache, or manipus vogociers ; but that he hij milliont all no resolute thems would make the appropriate the about the second

tity of water. At this flame, he observed, the shepherds

were in the habit of cooking their food.

This phenomenon appears to Captain Beaufort to have existed for many ages, and he is persuaded that it is the spot to which Pliny alludes in the following passage:— "Mount Chimera, near Phaselis, emits an unceasing flame, which burns day and night." Within a short distance is the great mountain of Takhtalu, the naked summit of which rises, in an insulated peak, 7800 feet above the level of the sea. In the month of August a few streaks of snow were discernable on the peak; but many of the distant mountains of the interior were completely white for nearly a fourth down their sides. It may hence be inferred, that the elevation of this part of Mount Taurus is not less than 10,000 feet, which is equal to that of Mount Etna.

Such a striking feature as this stupenduous mountain, in a country inhabited by illiterate and credulous people, cannot fail to have been the subject of numerous tales and traditions. Accordingly, the Captain was informed by the peasants, that there is a perpetual flow of the purest water from the very apex; and that notwithstanding the snow, which was still lingering in the chasms, roses blew there all the year round. He was assured by the Agha of Deliktash that every autumn a midnight groan is heard to issue from the summit of the mountain, louder than the report of any cannon, but unaccompanied by fire or smoke. He professed his ignorance of the cause; but on being pressed for his opinion, gravely replied, that he believed it was an annual summons to the elect, to make the best of their way to Paradise. However amusing this theory may have been, it may possibly be true that such explosions take place. The mountain artillery described by Captains Lewis and Clarke, in their travels in North America, and similar phenomena which are said to have occurred in South America, seem to lend some probability to the account. The natives have also a tradition, that when Moses fled from Egypt, he took up his abode near this mountain, which was therefore named Moossa-Daghy, or the mountain of Moses. Between this story, and the Yanar, as it has been described above, may there not have been some fanciful connection? The site of this volcanic opening is at an inconsiderable distance from the mountain; and the

the me teaming record the thicker which approximate it, may have been no been a conferred exercising with the hierarray hards an administ Rural, recorded to Landia.

HIMICULANITUM.

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the time and them the dark contains not spins thinkful of the containing flower and them to the find opening the standard to the containing the first three standards and the spins the spins of the spins the spins of the spins

terraneous investigation. The condition of Herculaneum was at that time much more interesting, and more worthy the notice of the traveller, than it is at present. The object of its excavation having unfortunately been confined to the discovery of statues, paintings, and other curiosities, and not calried on with a view to lay open the city, and thus to ascertain the features of its buildings and streets, most of the latter were again filled up with rubbish as soon as they were divested of every thing moveable. The marble even was torn from the walls of the temples. Herculaneum may therefore be said to have been overwhelmed a second time by its modern discoverers; and the appearance it previously presented, can now only be ascertained from the accounts of those who saw it in a more perfect state. Agreeably to them, it must at that time have afforded a most interest-

ing spectacle.

The theatre was one of the most perfect specimens of ancient architecture. It had, from the floor upwards, eighteen rows of seats, and above these, three other rows, which, being covered with a portico, seem to have been intended for the female part of the audience, to screen them from the rays of the sun. It was capable of containing between three and four thousand persons. Nearly the whole of its surface was, as well as the arched walls which led to the seats, cased with marble. The area, or pit, was floored with thick squares of giallo antico, a beautiful marble of a yellowish hue. On the top stood a group of four bronze horses, drawing a car, with a charioteer, all of exquisite workmanship. The pedestal of white marble is still to be seen in its place; but the group itself had been crushed and broken in pieces by the immense weight of lava which sell on it. The fragments having been collected, might easily have been brought together again, but having been carelessly thrown into a corner, a part of them were stolen, and another portion fused, and converted into busts of their Neapolitan Majesties. At length, it was resolved to make the best use of what remained, that is, to convert the four horses into one, by taking a fore leg of one of them, a hinder leg of another, the head of a third, &c. and, where the breach was irremediable, to cast a new To this contrivance the bronze horse in the courtyard of the Museum of Portici cwes its existence; and,

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to the finate, which was combronise to the theater, be dide a transfer of innerty-come, relations, i.e. two to willing expositions exceed in the Hallin analyse considered. These strend white morphise, and are depended to the hall of the fight owner of the Faharon p fortal.

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served as to admit of their removal to a similar set of modern presses, provided, however, with glass doors, in the museum.

In the middle of the garden belonging to this villa, was a basin nearly of the size and form of the one in the Green Park, having its edges faced with stone, and the two narrow ends rounded off in a semicircular form. This piece of water was surrounded by beds or narterres of various shapes; and the garden was on every side enclosed by a covered walk supported by columns. Of these columns there were sixty-four, ten for each of the shorter, and twenty-two for each of the longer sides of the quadrangle: they were made of brick, neatly stuccoed over, exactly similar to those in the Pompeian barracks. Each pillar supported one end of a wooden beam, the other extremity of which rested on the garden wall, thus forming an arbour, in all probability planted with vines, around the whole garden. Under this covered walk, several semicircular recesses, which appear to have served as bathing-places, were built. The spaces between the pillars were decorated with marble busts and bronze statues, alternately arranged.

This garden was surrounded by a narrow ditch; and another covered walk, of a considerable length, led to a circular balcony, or platform, the ascent to which was by four steps, but which overhung the sea about fifteen feet. The floor of the balcony consisted of the very beautiful tesselated pavement, which now serves as the floor of one of the rooms of the Portici museum. From this charming spot the prospect over the whole Bay of Naples, including the mountains of Sorrento, the Island of Capri, and Mount Posilipo, must have been delightful.

POMPEIJ.

[See Plates, No. 30, 31.]

A GREAT and rich town, which, after lying eighteen centuries in a deep grave is again shone on by the sun, and stands amidst other cities, as much a stranger as any one of its former inhabitants would be among his descendants of the present day—such a town has not its equal in the world.

The distance from Naples to Pompeii is little more than

(or Project pitter. Sugar the There well Sammeren, is the left, and and talk planned and oner aid, the coals secret, which, theremay of its shown of whice, came both with the grave, hand on the year. The healthar are without make which are enjoyment to have been drawinged to support the anatogramment date, written and by a buent ame. The treets of the wheels which are really collect area the respondent are sell visible. An charact path one by the with all the temporary one find presentative plant, he profile them in rainy weather to pass more required bankly or the appropriate with, larger that attention, there of a heat rake my the madels of the room, were brid at a distance those could write As the correspond to confer to available three stones, were addlemal in the intermediate spaces, the fracts of the whole The whole of the personal lane and supplement. If a marks provely of manufactable places of lunu, which, however, are not only so of the parents, in

The part which was feet cleaned, to suppose a colorment the mean errors of Panguid; but there is much to be
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effect. In the middle is a cooling well; and on each side a little chamber, about ten or twelve feet square, but lofty. and painted with a fine red or yellow. The floor is of mosaic; and the door is made generally to serve as a window, there being but one apartment which receives light through a thick blue glass. Many of these rooms are supposed to have been bed-chambers, because there is an elevated broad step, on which the hed may have stood, and because some of the pictures approx most appropriate to a Others are supposed to have been dresssleeping-room. ing-rooms, on this account, that on the walls a Venus is described decorated by the Graces, added to which little flasks and boxes of various descriptions have been found in them. The larger of these apartments served for dining-rooms, and in some are to be met with suitable accommodations for cold and hot baths.

The manner in which a whole room was heated, is particularly curious. Against the usual wall a second was erected, standing at a little distance from the first. For this purpose large square tiles were taken, having, like our tiles, a sort of hook, so that they kept the first wall as it were off from them; a hollow space was thus left all around, from the top to the bottom, into which pipes were introduced, that carried the warmth into the chamber, and as it were rendered the whole of the place one stove. The ancients were also attentive to avoid the vapour or smell from their lamps. In some houses there is a niche made in the wall for the lamp, with a little chimney in the form of a funnel through which the smoke ascended. Opposite to the house-door the largest room is placed: it is properly a sort of hall, for it has only three walls, being quite open in the fore part. The side rooms have no connection with each other, but are divided off like the cells of monks, the door of each leading to a fountain.

Most of the houses consist of one such square surrounded by rooms. In a few some decayed steps seem to have led to an upper story, which is no longer in existence. Some habitations, however, probably belonging to the richer and more fashionable, are far more spacious. In these a first court is often connected with a second, and even with a third, by passages: in other respects their arrangements are pretty similar to those above described.

along generals of theorem and enterineousless, and many limited and planting, are will recta or as on the mills. The grades error to the mills of the product to appendic these planting with their farmer to the products of travelless, and thus recent chair farmer spanished to, a government that the University to-findless; and, indeed, any without reasons chare the leaguest qualitating trights as largest possibly and away the wall.

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It was not a stream of fire that encompassed their abodes: they could then have sought refuge in flight. Neither did an earthquake swallow them up; sudden suffocation would then have spared them the pangs of a lingering death.-A rain of ashes buried them alive by DEGREES! We will read the delineation of Pliny :-- " A darkness suddenly overspread the country; not like the darkness of a moonless night; but like that of a closed room, in which the light is of a sudden extinguished. Women earned, children moaned, men cried. Here, children were anxiously calling their parents; and there, parents were seeking their children, or husbands their wives; all recognized each other only by their cries. The former lamented their own fate, and the latter that of those dearest to them. Many wished for death, from the fear of dying. Many called on the gods for assistance: others despaired of the existence of the gods, and thought this the last eternal night of the world. Actual dangers were magnified by unreal terrors. The earth continued to shake, and men, half distracted; to reel about, exaggerating their own fears, and those of others, by terrifying predictions."

Such is the frightful but true picture which Pliny gives us of the horrors of those who were, however, far from the extremity of their misery. But what must have been the feelings of the Pompeians, when the roaring of the mountain, and the quaking of the earth, awaked them from their first sleep? They also attempted to escape the wrath of the gods; and, seizing the most valuable things they could lay their hands upon in the darkness and confusion, to seek their safety in flight. In this street, and in front of the house marked with the friendly salutation on its threshold, seven skeletons were found: the first carried a lamp, and the rest had still between the bones of their fingers something that they wished to save. On a sudden they were overtaken by the storm which descended from heaven, and buried in the grave thus made for them. Before the above mentioned country-house was still a male skeleton, standing with a dish in his hand; and, as he wore on his finger one of those rings which were allowed to be worn by Roman knights only, he is supposed to have been the master of the house, who had just opened the back-garden gate with the intent of flying, grow the disper meanwaland liter. Arrived sketches was fulled to the very presents in wall they had breat of their last, without learning have thereal by the parene of death to Amp the shape they had in their bonds. The levels are a communities, that the contament made interestinal have reme wind all all out, in out approximations in monthly to arry them. It consist which he have count from the funtiers could all free times hard, up & were the adapted in timer poultient; and to the manner their dusting was the less der while, earling that hearly man deals concepted them turn and other mores and their with a countries of the comment with the first page of the taken online to the buildings and willow? Here I in the the Lord Carlemon, there were emberted from whith y transplant The mine themself and also says point to himself planner spoldering, color disadulus prosection, and all the The soul countle from the contemplation of and kinners

To prevent may be the public estines. The tempte of two is cult simular, with he thuse pillows and he walls publicate with inclease to the corps of the delty, man as the his preparation, consolibration, thus, &c. The manual results, being a paintenance colline of the are either to be come. From a little fraget verticiable, it patentine expans to each to again to mark the artists the health puries may have mad not never upone to the public. This requires is a full to have been appeared after the violent coupling of Very large.

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A small Green arrangle, of which only two pillars remain, had been problemly directly alternated by no explication, which, its she respected follow, presented the directled completes of the experience of the opposite while at the copy to there to sail the effects, reflect the quarters of the arbitrary is store at expert of expert of the property of the arbitrary is store at expert of the arbitrary of a store at expert of the expert of the arbitrary of the arbit

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commedious seats, a free view of the stage, and facility of hearing. Although sufficiently large to contain two thousand persons, the plebeans, standing in a broad gallery at the top, were quite as able to see all that was passing on the stage as the magistrate in his marble balcony. In this gallery the arrangements for spreading the sail-cloth over the spectators are still visible. The stage itself is very broad. as it has no side walls; and appears less deep than it really A wall runs across it, and cuts on just as neuch worth as is necessary for the accommodation of the performers. But this wall has three very broad doors; the middle one is distinguished by its height, and the space behind it is still deeper than in front. If these doors, as may be conjectured, always stood open, the stage was in fact large, and afforded besides the advantage of being able to display a double scenery: if, for example, the scene in front was that of a street, there might have been behind a free prospect into the open field.

The cemetery lies before the gate of the high road. The tomb of the priestess Mammea is very remarkable: it was erected, according to the epitaph, by virtue of a decree of the Decemvirs. In the midst of little boxes of stone, in square piles, and on a sort of altar, the family was were placed in niches; and withoutside these piles the broken masks are still to be seen. In front of the cemetery, by the road side, is a beautiful seat, forming a semicircle, that will contain twenty or thirty persons. It was probably overshaded by trees eighteen hundred years ago; under which the women of Pompeii sat in the cool evenings, while their children played before them, and viewed the crowds

which were passing through the gate.

To the above particulars from the pen of the elegant and lively Kotzebue, the following details, given by a late very

accurate traveller, are subjoined.

The entrance into Pompeii is by a quadrangular court, nearly of the size of the railed part of our Leicester Square. This court is surrounded on every side by a colonnade which supports the roof of a gallery; and the latter leads to several small apartments, not unlike the cells of a prison. The columns are of brick, stuccoed over, and painted of a deep red: they are in height from ten to twelve feet; are placed at about a like distance from each other;

and are at the Prime, at a place town thirds from the implement will proportion. After a smooth of conjectures we lighted to the purpose to which this limbling time applicable has been acceptable. It has been acceptable that it was either a lighted to entitle a light proportion of the time and in another the formal proportion of the time area, where to book ut military must have been applicable. Adjusted to a small the time that the time are the compilery at military must have been applicable. Adjusted to a small the time that the conjugatory will conjugate the formal of every next and are proved course.

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ed by garlands of flowers; and within the basin, which is of baked earth, the very cinders left from the last sacrifice (nearly two thousand years ago,) are seen as fresh as if they had been the remains of yesterday's fire! From the above court, you enter on a somewhat larger,

From the above court, you enter on a somewhat larger, with a stone pulpit in the centre, and stone seats near the walls. The spot therefore, was either the auditory of a philosopher, or the place where the public orators pleaded in the presence of the people. Every thing here is in the highest order and preservation.

The great amphitheatre proudly rears its walls over every other edifice on the same elevated spot. It is a stupe adous structure, and has twenty-four rows of seats, the circumference of the lowest of which is about 750 feet. It is estimated to have contained about 30,000 spectators. The upper walls are much injured, having partially projected above ground long before the discovery of Pompeii.

A corn-field leads to the excavated upper end of the high street, which consists of a narrow road for carts, with footpavements on each side. The middle is paved with large blocks of marble, and the ruts of the wheels proclaim its antiquity, even at the time of its being overwhelmed. foot-paths are elevated about a foot and a half from the level of the carriage-road. The houses on each side, whether shops or private buildings, have not any claim to external, elegance: they consist of a ground-floor only, and, with the exception of the door, have not any opening towards The windows of the private houses look into an inner square court, and are in general very high. The apartments themselves are, with the exception of one in each house, which probably served as a drawing-room, both low and diminutive. In point of decoration they are neat, and, in many instances, elegant: the floors generally consist of figured pavements, either in larger stones of various colours, regularly cut and systematically disposed, or are formed of a beautiful mosaic, with a fanciful border, and an animal or figure in the centre. The geometrical lines and figures in the design of the borders, have an endless variety of the most pleasing shapes, to display the fertile imagination of the artists. Their tesselated pavements alone must convince us that the ancients were well skilled in geometry. The ground is usually white, and the orna-



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The walls of the uparturence are equally, if my will person direct your ago minn. They are person, enther to access you thereto, excellent and one the house of blatters it were of amply columned any easily a light promptly of a med to the a housen and perhaps in classes little sample to the writes to its regard domestics. That it is the identical positioning the extension of the position of the management of the positioning of the position broud to conside a redescribe presure, is not removed and beyondhaf in the morning of Perfore. To what day to we are a tree and insertally a marriage and, as we happened a went han thress that to word private to consine eff go separation in alless, although the grotuin. This A memory, who that a disabell throughout, too, mono galle ancommittee of white, the adjustment out of the ment menting painting which fruitten aparamit >the automa themselve from a coll, with the aboless and of their being numbered to another place. This was his. entirely all line exite with the reast set get from some trees thereenes, were framed framing against the soul of the agrees

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territory. What still remains, however, in the Museum. has a high intrinsic value; since who can behold, without the strongest emotions of admiration, the relics of the most transitory things, which for nearly eighteen hundred years, have braved the ravages of time? Here are to be seen bread, corn, dough which was about to be placed in the oven, soap which had been used for washing, figs, and even egg-shells perfectly white, and in as good a state as if the cook had broken them an hour before. Here a kitchen presents itself provided with every thing requisite: trivets and pots stand on the hearth; stew-pans hang on the wall; skimmers and tongs are placed in the corner; and a metal mortar rests on the shaft of a pillar. Weights, hammers, scythes, and other utensils of husbandry, are here blended with helms and arms. Sacrificing bowls and knives; a number of well-shaped glasses; large and small glass bottles; lamps; vases; decorations for furniture; a piece of cloth; nets; and even shoe soles; all sorts of female ornaments,-necklaces, rings, and ear-rings; a wooden chessboard, reduced, indeed, to a cinder: all these things are more or less injured by the fire; but still are distinguishable at first sight.

Every apartment of the museum is laid with the most charming antique floors, which are partly mosaic, from Pompeii, and partly marble, from Herculaneum. Statues, vases, busts, chandeliers, altars, tables of marble and bronze, are all in as good a state as if they had just come from the hands of the artist. The coins which have been collected are very numerous, and fill several cases. Medallions of marble, containing on each side a bas-relief, are suspended by fine chains from the ceiling of one of the apartments, and are within the reach of the hand, so as to be conveniently turned and examined.

Most of the pictures found at Herculaneum, Pompeii, and Stabiæ, and now deposited in the museum, have been sawed from the walls of the edifices they adorned. These unique relics of ancient art form an extensive gallery of genuine antique pictures, the only one in the world, and may on that account alone, be considered as an inappreciable treasure. They are placed in a range of apartments on the ground floor, and are suspended against the walls in plain frames. Their size varies from a foot square, to

would-dought groupes, meanly as known as fille. It was been good to the first of humbring clother, they have been impossed by the medical companied while was laterated to protect them. It would, the nature of age is a laterated to protect them. It would, the nature of age; but the groupery at the Manmaur at the Talegards, of the attributed to the Constitution of the International and the internations as well as in their subjects of compilarly which effecting the constitution of anyther, which effecting the constitution of the international and the masterial, and the problem of the composition are constituted, entity of subject, and onto at composition are constituted, entity of subject, and onth at internation. When we was, it is consistent to the entitle at Patern two entitles the polytope collaboration to the encourse as Patern two entities the consistency continues the laterate and the Apollo-land uses the polytope with the haveners and the Apollo-land uses the polytoperation of the appropriate their each so not to be observed.

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charcoal, or cudgels reduced to the state of a cinder, and partly petrified. They are black and chesnut-brown; and are unfortunately so decayed, that under each of them, as they lie in glass cases, a quantity of dust and detached fragments may be perceived. Their characters are legible in a certain light only, by a gloss and relief which distinguishes the ink, or rather black paint, from the tinder. Cut, crushed, crumbled on the edge, and caked by the sap remaining, in the leaves of the papyrus, they require in the operator great sagacity to meet the variety of injuries they have reseived; since, in gluing rashly the more delicate parts, he might reach the heart of a volume, while working at the outside. At first, it appeared almost impracticable ever to decypher a syllable of them; but to the industry and talents of man nothing is impossible, and his curiosity impels him to the most ingenious inventions.

*As the preservation of the subterraneous cities of Herculaneum and Pompeii was owing to a natural cause, that of the dreadful eruption of Vesuvius in the seventy-ninth year of the Christian era, the details relative to these cities, and the interesting results to which their discovery has led, have been introduced among the class of natural wonders now under consideration.

EARTHQUAKES.

"He looketh on the earth, and it trembleth: he toucheth the hills, and they smoke."

Towers, temples, palaces,
Flung from their deep foundations, roof on roof
Crushed horrible, and pile on pile o'erturned,
Fall total.
MALLET.

The globe around earth's hollow surface shakes, And is the ceiling of her sleeping sons. O'er devastation we blind revels keep; Whose buried towns support the dancer's heel.

Youne.

That fires to a very great extent, and produced by various causes, exist at different depths beneath the surface of the earth, must be evident to those who have attentively perused what has been given under the head of Volcanoes;

only as all repertures have above that, where he also comes to which each those succes, be at a considerable depote, and are automated by a very above and to revenue promotion processes, must accessed to when they were target portions of static grows, the alless of each first will be comply grows, and come observation, then whose the change of the completence and plants.

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In a year performed in the Pintonunicum Transcritoria. Let I come monthly a revelopment of the American medical communication of the American medical properties. O consistential supplies, or models of consistential communications of the American constitutions of another than the complete and constitution of the China had been consistential or the China had been consistential through the constitution of the China had considered the constitution of the constitutio

of dew, rain, springs, and rivers, being diverted from its ordinary course by some accidental obstruction in the pores through which it used to ascend to the surface, becomes, by such means, preternaturally assembled in a greater quantity than usual, in one place, and thus causes a rarefaction and intumescence of the water of the abvss, throwing it into greater commotions, and at the same time making the like effort on the earth, which, being expanded on the surface of the abyss, occasions an earthquake. Mr. Mitchell supposes these phenomena to be occasioned by subterraneous fires, which if a large quantity of water be let loose on them suddenly, may produce a vapour, the quantity and elastic force of which may fully suffice for the purpose. Again, M. Amontus, a member of the French Academy of Sciences, endeavours to prove, that, on the principle of experiments made on the weight and spring of the air, a moderate degree of heat may bring that element into a state capable of causing earthquakes.

Modern electrical discoveries have thrown much light on this subject. Dr. Stukely strenuously denies that earthquakes are to be ascribed to subterraneous winds, fires, or vapours; and thinks that there is not any evidence of the cavernous structure of the earth, which such a hypothesis requires. Subterraneous vapours he thinks, are altogether inadequate to the effects produced by earthquakes, more particularly in cases where the shock is of considerable extent: for a subterraneous power, capable of moving a surface of earth only thirty miles in diameter, must be lodged at least fifteen or twenty miles below the surface, and move an inverted cone of solid earth, whose basis is thirty miles in diameter, and axis fifteen or twenty miles, which he thinks absolutely impossible. How much more inconceivable is it, then, that any such power could have produced the earthquake of 1755, which was felt in various parts of Europe and Africa, and in the Atlantic ocean; or that which in Asia Minor, in the seventeenth year of the Christian era, destroyed thirteen great cities in one night, and shook a mass of earth three hundred miles in diameter. To effect this, the moving power, supposing it to have been internal fire or vapour, must have been lodged two hundred miles beneath the surface of the earth! Besides, in earthquakes, the effect is instantaneous; whereas the equivariant of share expense, and its thin harper seems to graduat, and require a busy opens of them, and it there in tweig to explication, they remain after the envisor of the country who to they happen, distinct the familians and equipmen, and change the envisor of the familians and equipmen, and change the envisor of the familians are envision.

To three and other considerations the Dieser Idda that the combre which dilps were to during an methquises, much the measurement by supporting which was commonwate necessity tion with much greater releasity them any heaving of the rarelle parder the seas, consend by the chaterily of parenteed expenses which would namely produce a graciant worth, and not one to an imparishment the motor or re-intelligence in lent blood que this limitions of a chip, or less earth our on a coath, Themselve decreas the common hypothesis brould lent, and while or control removes to about the nurthquakes are sereality obereto this has. To confirm this equation, by make en, among other phenomena, either preventing or afterelting enetlinguishes, that the weather is usually dry at I marin In some time house they happen, and that the answer of the greenst is thus proviously property by that kend or atterried retriction in which they conside; while, as the catter tipes, he enjoyed places which they have negligible. the inverted pure, at a simil dispit la month the circles. stone makes and hogyy. However he after, that they rearry very little between the wien . That the mathem region. are more subject to enthapoles through the muslims, he throme to range to the period marnets and occurs of the earth and at , which we qualities of over mer in others. erry. As may have no content, thus, no mention continuations of Landing in 1711, all organization on maintaily for worth and it is well known, that should be gen know error enterior. The meaning and strength again name of horest and natural average, and the variety of purchas by which continuates not presented, bade to an enterprisal state of the atmosphere, and the Herrie appear hands that, in this women and the continuous air, memory others to recessive the constant Districtions, then the approach of a form where the steel and the sharpment of the contents, refrance dent of the except, when in a higher electrified some his " or o commences in the human healt, an the slave perduced by the discharge between the cloud and many miles in compass of solid earth, must be an earthquake, and the

anap from the contact the noise attending it.

The theory of M. de St. Lazare differs from the above hypothesis, as to the electrical cause. It ascribes the production of earthquakes to the interruption of the equilibrium between the electrical matter diffused in the atmosphere, and that which belongs to the mass of our globe, and pervades its bowels. If the electrical fluid should be superabundant, as may happen from a variety of causes, its current, by the laws of motion peculiar to fluids, is carried towards those places where it is in a similar quantity; and thus it will sometimes pass from the internal parts of the globe into the atmosphere. This happening if the equilibrium be re-established without difficulty, the current merely produces the effect of what M. de St. Lazare calls ascending thunder; but if this re-establishment be opposed by considerable and multiplied obstacles, the consequence is then an earthquake, the violence and extent of which are in exact proportion to the degree of interruption of the equilibrium, the depth of the electric matter. and the obstacles which are to be surmounted. If the electric furnace be sufficiently large and deep to give rise to the formation of a conduit or issue, the production of a volcano will follow, its successive eruptions being, according to him, nothing more in reality than electric repulsions of the substances contained in the bowels of the earth. From this reasoning he endeavours to deduce the practicability of forming a counter-earthquake, and a countervolcano, by means of certain electrical conductors, which he describes, so as to prevent these convulsions in the bowels of the earth.

The opinion of Signior Beccaria is nearly similar; and from his hypothesis and that of Dr. Stukely, the celebrated Priestley has endeavoured to form one still more general and more feasible. He supposes the electric fluid to be in some mode or other accumulated on one part of the surface of the earth, and, on account of the dryness of the season, not to diffuse itself readily: it may thus, as Beccaria conjectures, force its way into the higher regions of the air, forming clouds out of the vapours which float in the atmosphere, and may occasion a sudden shower, which

there in these products the progress. The whole concentration with the any other conducting substance, there is a continuing substance, the continuing material to the continuing poles will be use server over the winds extent of the country; and, so the supposition about the dide, in its abundance from the surface of the substance of any the country is substance, and will take the advantage of any continues in the server, and will take the advantage of any continues to facilitate do useful time the ingless regions at the air.

Such are the asymmetric in Layers of the effective hyposthesis, but, since if his feets equipment with its much esting, in transitions writer. Whitehard, in the Lagury into the committee which and formation of the Corth, contends that substraintees here, and the stoom assumes to true it me the true and rail syntees at murilyandos. When, he absence, it is considered that the expansive forces it seems to its literal graphical developments of proposite forces in the instability of seems, are in every may expand at promining the simples done there are the expansive forces.

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ward, so as to be felt in different countries at different hours of the same day. This may be accounted for by the violent shock given to the earth at one place, and communicated progressively by an undulatory motion, successively affecting different regions as it passes along, in the same way as the blow given by a stone thrown into a lake, is not perceived at the shore until some time after the first concussion. Sixthly, the shock is sometimes instantaneous, like the explosion of gunpowder, and sometimes tremulous, lasting for several minutes. The nearer to the observer the place where the shock is first given, the more instantaneous and simple it appears; while, at a greater distance, the earth seems to redouble the first blow, with a sort of vibratory continuation. Lastly, as the waters have in general so great a share in the production of earthquakes, it is not surprising that they should generally follow the breaches made by the force of fire, and appear in *the great chasms opened by the earth.

EARTHQUAKES OF REMOTE TIMES.

THE most remarkable earthquakes of ancient times are described by Pliny in his Natural History. Among the most extensive and destructive of these was the one already noticed, by which thirteen cities in Asia Minor were swallowed up in one night. Another which succeeded, shook the greater part of Italy. - But the most extraordinary one, described by him, happened during the consulate of Lucius Mareus and Sextus Julius, in the Roman province of Mutina. He relates, that two mountains felt so tremendous a shock, that they seemed to approach and retire with a most dreadful noise. They at the same time, and in the middle of the day, cast forth fire and smoke, to the dismay of the astonished spectator. By this shock several towns were destroyed, and all the animals in their vicinity killed. During the reign of Trajan, the city of Antioch was, together with a great part of the adjacent country, destroyed by an earthquake; and about three hundred years after, during the reign of Justinian, it was again destroyed, with the loss of forty thousand of its inliabitants. Lastly, after an interval of sixty years, that

denoted they was a third time overwhelmed, with a last of

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15- Plate, No. 12.1

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the tottering of towers, and the groans of the dying, all contributed to excite emotions of terror and despair. Danger threatened him wherever he should fee; but, having remained unhurt amid the general concussion, he resolved to venture for safety, and reached the shore, almost terrified out of his reason. Here he found his companions, whose terrors were still greater than his own.

He landed on the following day at Rochetta, where the earth still continued to be violently agitated. He had, however, scarcely reached the inn at which he intended to lodge, when he was once more obliged to return to the boat: in about half an hour the greater part of the town, including the inn, was overwhelmed, and the inhabitants

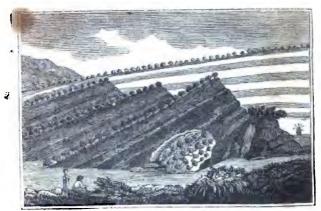
buried beneath its ruins.

Not finding any safety on land, and exposed, by the smallness of the boat to a very hazardous passage by sea, he at length landed at Lopizium, a castle midway between Tropæa and Euphæmia, the city to which he was bound. Here, wherever he turned his eyes, nothing but scenes of ruin and horror appeared: towns and castles were levelled to the ground; while Stromboli, although sixty miles distant, was seen to vomit flames in an unusual manner, and with a noise which he could distinctly hear. From remote objects his attention was soon diverted to contiguous danger: the rumbling sound of an approaching earthquake, with which he was by this time well acquainted, alarmed him for the consequences. Every instant it grew louder, as if approaching; and the spot on which he stood shook so dreadfully, that being unable to stand, himself and his companions caught hold of the shrubs which grew nearest to them, and in that manner supported themselves.

This violent paroxysm having ceased, he now thought of prosecuting his voyage to Euphæmia, which lay within a short distance. Turning his eyes towards that city, he could merely perceive a terrific dark cloud, which seemed to rest on the place. He was the more surprised at this, as the weather was remarkably serene. Waiting, therefore, until this cloud had passed away, he turned to look for the city; but, alas! it was totally sunk, and in its place a dismal and putrid lake was to be seen. All was a melancholy solitude—a scene of hideous desolation. Such was the fate of the city of Euphæmia; and such the



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No. 32.—Earthquake in Calabria.



No. 33.-Earthquake in Lisbon.

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that the most resolute person durst not stay a moment to extricate the friend he loved most affectionately, by the removal of the stones beneath the weight of which he was crushed. Self-preservation alone was consulted; and the most probable security was sought, by getting into open places, and into the middle of the streets. Those who were in the upper stories of the houses, were in general more fortunate than those who attempted to escape by the doors, many of the latter being buried beneath the ruins, with the greater part of the foot passengers. Those who were in carriages escaped the best, although the drivers and cattle suffered severely. The number, however, of those who perished in the streets, and in the houses, was greatly inferior to that of those who were buried beneath the ruins of the churches; for, as it was a day of solemn festival. these were crowded for the celebration of the mass. were more numerous than the churches of London and Westminster taken collectively; and the lofty steeples in most instances, fell with the roof, insomuch that few escaped.

The first shock as has been noticed, was extremely short, but was quickly succeeded by two others; and the whole, generally described as a single shock, lasted from five to seven minutes. About two hours after, fires broke out in three different parts of the city; and this new calamity prevented the digging out of the immense riches concealed beneath the ruins. From a perfect calm, a fresh gale immediately after sprang up, and occasioned the fire to rage with such fury, that in the space of three days the city was nearly reduced to ashes. Every element seemed to conspire towards its destruction; for, soon after the shock, which happened near high water, the tide rose in an instant forty feet, and at the castle of Belem, which defends the entrance of the harbour, fifty feet higher than had ever been known. Had it not subsided as suddenly, the whole city would have been submerged. A large new quay sunk to an unfathomable depth, with several hundreds of persons, not one of the bodies of whom was afterwards found. Before the sea thus came rolling in like a mountain, the bar was seen dry from the shore.

The terrors of the surviving inhabitants were great and multiplied. Amid the general confusion, and through a

convery or hands, the dead beather could not be laughed, and a rose dynamical that is possibly a would chose , but from this appearance that your relieves by the fire, by white these lands were do the present part generated. The course of a future continue the present part generally discourse the three discs on seeing the methicische, not more of beauty would a grant of gold. Several of the rose one course beauty seen, hereaver, furturally seven from more anneally analysis of treat was attended by meaned board of the pollular and appeared of these who had expended of the pollular and course of these who had expended of the pollular and this happened of a varied internece, and it employs were usual of the optimes, pursue.

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A land in the class, almost a mile distant from Labour, we have by the prosperse we make a miles as if it has any account, although then in done water their at the arms time one the house spilling on both sides of the river in trans of which, on the I seems side, the greater part of is consume fell, burying mandy of the finances homesty the mins while others were presipated into the every The nates was recorded with thest, blusen by a strong mustically word a mai the some matchly otherwisels. The building, there were street by the specificating of the waters mater firefri resumes, where they provided the een, as a mile and But here a then algorithe , hereigh a dill in guidere , anne. Plan land of the Tayne was a many plan - report to to portace, + time entire work aftern home floor anchorawill not some section the paper when or returned. with grand and extremely there are not only the sound the part of farming repaired that, being true buryon of ma-

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Lisbon, and within two miles of the sea. On the last day of October, the weather was clear, and remarkably warm for the season. About four o'clock in the afternoon a fog arose, proceeding from the sea, and covering the vallies. which was very unusual at that season of the year. The wind shifted soon after to the east, and the fog returned to the sea, collecting itself, and becoming exceedingly thick. As the fog retired, the sea rose with a prodigious roaring. On the first of November, the day broke with a serene sky, the wind continuing at east; but about nine o'clock the sun began to be obscured; and about half an hour after a rumbling noise was heard, resembling that of chariots, and increasing to such a degree, that at length it became equal to the explosions of the largest artillery. Immediately a shock of an carthquake was felt; and this was succeeded by a second and a third, at the same time that several light flames of fire, resembling the kindling of charcoal, issued from the mountains. During these three shocks, the walls of the buildings moved from east to west. In another spot, where the sea-coast could be descried, a great quantity of smoke, very thick, but somewhat pale, issued from the hill named the Fojo. This increased with the fourth shock, at noon, and afterwards continued to issue in a greater or less degree. Immediately as the subterraneous rumblings were heard, the smoke was observed to burst forth at the Fojo; and its volume was constantly proportioned to the noise. visiting the spot whence it was seen to arise, not any sign of fire could be perceived near it.

After the earthquake, several fountains were dried up; while others, after undergoing great changes, returned to their pristine state. In places where there had not been any water, springs burst forth, and continued to flow; several of these spouted to the height of nearly twenty feet, and threw up sand of various colours. On the hills rocks were split, and the earth rent; while towards the coast several large portions of rock were thrown from the eminences into the sea.

At Oposto, near the mouth of the river Duero, the earthquake was felt at the same time as at Lisbon. The sky was very serene, when a dreadful hollow noise, resembling thunder, or the rattling of coaches at a dis-

imming the terminal direction of the series contained fine any begins to quoke. In the sponse of two minutes, the experience of the contained to the or to have been been as a few management it can write expense our management of containing the containing of the co

During the less clamb, which was very writing the lames in the city were readed, as if his convidence, and every timing within climbia and either to exchange the alternative this hinter multiple the cityrate, where the cartle was reliability or to become up. As our reliability in the bound of the country transfer tendent areas who ich. This may the complete characteristics of the profession tendent to the contract clambia country, with a profession to the type of the received and the application of the research and the application of the regard himself.

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As a sure a societal of Espain, recording to the repreof 1200 Amounts of Thou, the corthopolic rangement of three points after once in the hooming of the hear is Accombine, and conflicted flyer interested, the regular to go at the tare traper body our bisses, he alterize a got beterior to statement retting which anothered no bone and I'mling in from towns the only in Circline, 17 160, and was morely of man or the denotions the lover testime books tito an illing minutes right. Plant were thing have up. min illeationers. Appropria to have been union to the creatwhite of the torndame. The make or the rouses and of country out water the farmed and I want and to a course I cold a road etath. The tides of the fall boil quest the master and danches explain our at the over the north party was trees in the property of . The distance of a district is and to bred a feet only life him

than usual. It dashed against the west part of the city. which is very rocky. Although its force was much broken by these rocks, it at length reached the walls, and beat in the breast-work, which was sixty feet above the ordinary level of the water, removing pieces of the fabric, of the weight of eight or ten tons, to the distance of forty or fifty yards. At half past eleven came a second wave: and this was followed by four others of equal magnitude. Others, but smaller, and gradually lessening, continued at uncertain intervals until the evening. A considerable part of the rampart was thrown down, and carried by the torrent above fifty paces. Several persons perished on the causeway leading to the Isle of Lesu. The accounts brought to Cadiz reported that SEVILLE had been much damaged, and that a similar fate had attended St. Lucar and CHERES. CONEL was said to have been destroyed: and, indeed, with the exception of the provinces of Catalonia, Aragón, and Valencia, the effects of this earthquake were felt throughout Spain.

At Market the shock was very sensibly felt soon after ten in the morning, and lasted five or six minutes. At first the inhabitants fancied they were seized with a swimming in the head; and, afterwards, that the houses were falling. In the churches the sensations were the same, and the terror so great, that the people trod each other under foot in getting out. Those who were within the towers were still more affrighted, fancying every instant while the shock lasted, that they were falling to the ground. It was not sensible to those who were in carriages, and very

little so to foot passengers.

At GIBRALTAR it was felt about the same time as at Madrid, and began with a tremulous motion of the earth, which lasted about half a minute. A violent shock succeeded; and this again was followed by a second tremulous motion, of the duration of five or six seconds. Another shock, not so violent as the first, subsided gradually; and the whole lasted about two minutes. Several of the guns on the batteries were seen to rise, and others to sink, while the earth had an undulating motion. The greater part of the garrison and inhabitants were seized with giddiness and sickness: several fell prostrate; others were stupified; and many who were walking or riding, became aick, with-

and to my consider all one upstron of the earth. Livery at to a remarked the every pressure from a result from tell to began their the trees and and read one of the chare were twice agree and. to we could be prouted of small and . The this and a disbeared all most inventor, baseing the point, becaliedly trong two in the atternoons,

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water mark, although the tide, which there flows seven feet, was at half-ebb. The water immediately receded; and after having fluctuated four or five times between high and low water mark, it subsided, and the sea remained calm as before. In the northern part of the island the inundation was more violent, the sea there retiring above a hundred paces at first, and suddenly returning, overflowed the shore, forcing open doors, breaking down the walls of several magazines and storehouses, and leaving great quantities of fish ashore, and in the streets of the village of Machico. All this was the effect of one rising of the sea. for it never afterwards flowed high enough to reach the high-water mark. It continued, however, to fluctuate here much longer before it subsided than at Funchal; and in some places farther to the westward, it was hardly, if at all, perceptible.

These were the phenomena with which this remarkable earthquake was attended in those places where it was most violent. The effects of it, however, reached to an immense distance: and were perceived chiefly by the agitations of the waters, or some slight motion of the earth. Its utmost boundaries to the south are unknown; the barbarity of the African nations rendering it impossible to procure any intelligence from them, except where the effects were dreadful. On the north, however, we are assured, that it reached as far as Norway and Sweden. In the former kingdom, the waters of several rivers and lakes were violently agitated. In the latter, shocks were felt in several provinces, and all the rivers and lakes were strongly agitated, especially in Dalecarlia. The river Dala suddenly overflowed its banks, and as suddenly retired. At the same time, a lake at the distance of a league from it, and with which it had no manner of communication, bubbled up with great violence. At Fahlun, a town in Dalecarlia, several strong shocks were felt.

In many places of Germany the effects of this earthquake were very perceptible; but in Holland, the agitations were still more remarkable. At Alphen on the Rhine, between Leyden and Woerden, in the afternoon of the first of November, the waters were agitated to such a violent degree, that buoys were broken from their chains, large vessels snapped their cables, small ones were thrown use of the writer upon the land, and others bying inclinal were set albert. At Association, along the vest in the foreseen, the six being pasts the value, the vesters were updaying agineted by their caude, so that several lengthrokes hower clausdeffers were abserved to vibrate in the chiralism (but an motion of the cause, or commenced of any building was observed. At It convers, in the formation, for nearly fare minimum, but any the water in the river, causing for that the minimum, and an amilier quantities, as in couldness, takes, but in, deriver anymotopy opinion, and dealerd over the tides, the tipe is more anymotopy parentles to the vessels the minimum in the more one that initial apparently ascended power to the minimum and the time that apparently ascended power to the minimum and one that in the preparation process of the rivers will apparently ascended power to the minimum and one that preparationly assembles are the rivers will apparently assembled as a second and the rivers and assembled as a second and the rivers and assembled as a second and the rivers and as a second and the rivers and assembled as a second and the rivers and as a second as a

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its grass walk. During this latter motion, the bottom on the northside was left dry for several feet. This appearance lasted for about a quarter of an hour, after which the water became smooth and quiet as before. During the whole time, the saud at the bottom was thrown up and mixed with the water; and there was a continual noise like that of water turning a mill. At COBHAM, in Surrey, DUNSTALL, in Suffolk, EARSY COURT, in Berkshire, EATONBRIDGE, Kent, and many other places, the waters were variously agitated.

At EYAM-BRIDGE, in Derbyshire Peak, the overseer of the lead-mines, sitting in his writing-room, about eleven o'clock, felt a sudden shock, which very sensibly raised him up in his chair, and caused several pieces of plaster to drop from the sides of the room. The roof was so violently shaken, that he imagined the engine-shaft had been falling in. Upon this he immediately ran to see what was the matter, but found every thing in perfect safety. At this time two miners were employed in carting, or drawing along the drifts of the mines, the ore and other materials to be raised up at the shafts. The drift in which they were working was about a hundred and twenty yards deep, and the space from one end to the other fifty yards or upwards. The miner at the end of the drift had just loaded his cart, and was drawing it along; but he was suddenly surprised by a shock, which so terrified him, that he immediately quitted his employment, and ran to the west end of the drift to his partner, who was no less terrified than himself. They durst not attempt to climb the shaft, lest that should be running in upon them: but while they were consulting what means they should take for their safety, they were surprised by a second shock, more violent than the first; which frightened them so much, that they both ran precipitately to the other end of the drift. They then went down to another miner, who worked about twelve yards below them. He told them that the violence of the second shock had been so great, that it caused the rocks to grind upon one another. His account was interrupted by a third shock, which, after an interval of four or five minutes, was succeeded by a fourth; and, about the same space of time after, by a fifth; none of which were so violent as the second. They heard, after when I continue of altered that a colour, pradually described when I continue of altered that a colour,

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ebb of tide, and near three quarters after six in the everning, a vast quantity of water rushed up with a prodigious noise, floated two large vessels, the least of them above two hundred tons, broke their moorings, drove them across the river, and had like to have overset them. The whole rise and fall of this extraordinary body of water did not last above ten minutes, nor was it felt in any other part of the river, so that it seemed to have gushed out of the earth at that place.

Similar instances occurred at Loch Lonond and Loch Ness, in Scotland. At Kinsale, in Ireland, and all along the coast to the westward, many similar phenomena were

observed.

Shocks were also perceived in several parts of France, as at BAYONNE, BOURDBAUX, and LYONS; and commotions of the waters were observed at Angoulesme, Belleville, HAVRE DE GRACE, &c. but not attended with the remarkable circumstances above mentioned.

These are the most striking phenomena with which the earthquake of November 1, 1755, was attended on the surface of the earth. Those which happened below ground cannot be known but by the changes observed in springs, &c. which were in many places very remarkable.

At TANGLER, all the fountains were dried up, so that there was no water to be had till night. A very remarkable change was observed in the medicinal waters of Toplitz, a village in Bohemia, famous for its baths. These waters were discovered in the year 762; from which time the principal spring had constantly thrown out hot water in the same quantity, and of the same quality. On the morning of the earthquake, between eleven and twelve, in the forenoon, this principal spring cast forth such a quantity of water, that in the space of half an hour all the baths ran over. About half an hour before this great increase of the water, the spring flowed turbid and muddy; then, having stopped entirely for a minute, it broke forth again with prodigious violence, driving before it a considerable quantity of reddish ochre. After this, it became clear, and flowed as pure as before. It still continued to do so, but the water was in greater quantity, and hotter, than before the earthquake At Angoulesme, in France, a subterraneous noise, like thunder, was heard; and presently after, the cattle opened, and the large districts of a steel in a series of a manager that for some time they were shought to no in a manager, that for some time they were shought to be opinite dry. In Britain, pre-considerable algorithm was identicated in the with, everything near the feed units above as interested in the fivelency is clear was observed about a feed deep, as includes with, and one broadent near

At my the shorts of this earthquake more loss more violently. 4Mf St Linear, the Laple in of the Nancy till are White hip or violently shaken, that he thought she had signed the ground plant, on heaving the boat, found sho was him green depute at water. Capitain Chick John Deistin. in sorth hands thaty as there's many-har morning, and accomment up at she had short agency a reale, on that the make of the deth operand, and the company was extendurant in the blumate. The Monter of a grant binted to the Ammora insula, being in party latinger torong-me demore, went limitable large dragers, and pright in lise also in, board a vindent milion as for integrated, in the strerage . and while he was adone what the centrer was, the clop was part into a strange agreement, and seemed as it she had been anddeal, justed up, and acommind by a tupe faction of to the constituent. The immediately started its with great joing and astrodelinent; and looking our at the colinministra, and land, as he much to to be, at the distance at should a mile. Country upons the steels, the land was to more in the serviction by purerison a stalent carrent center the ality to may be the less mental. In alcour a majore, this concent command with price ingrements a and are league to Material, he care them manny mutited to be the mounts permittion, to short four admitted andred in a librale cloud, which account very to selly. Albert I had too a show the horrown, me or to were to be made; though the chand, will accombine, and long visible, the wouther bring commely that. Herete muc and ren in the motories. another day force teaung west of M. Vincent, date to enviroly apitated, that the anchora, which were lasting, countries on, and the men were thoown a lost and a bull rependicularly us train the dock. Daniedistely unes this. the ship sunk in the water as low as the main-chains. The lead showed a great depth of water, and the line was tinged of a yellow colour, and smelt of sulphur. The shock lasted about ten minutes; but they felt smaller ones for the space of twenty-four hours.

BARTHQUARDS IN SICILY, AND IN THE TWO

CALABRIAS.

THESE Earthquakes began on the 5th of February, 1783. and continued until the latter end of the May following, doing infinite damage, and exhibiting at Messina, in the parts of Sicily nearest to the Continent, and in the two Calabrias, a variety of phenomena. The part of the Calabrian provinces most affected by this heavy calamity, lies between the thirty-eighth and thirty-ninth degrees of latitude, being the extreme point of the Continent; and the greatest force of the earthquakes was exerted at the foot of the particular mountains of the Appenines, named Monte Deio, Monte Sacro, and Monte Caulone, extending westward to the Tyrrhene sea. The towns, villages, and farm-houses, nearest to these mountains, whether situated on the hills, or in the plains, were totally ruined by the first shock, which happened about noon; and there the destruction of lives was the greatest. The towns still more remote, were, however, greatly damaged by the subsequent shocks, particularly those of the 7th, 26th, and 28th of February, and that of the 1st of March. The earth was in a constant tremour, and its motions were various, being either vortical, or whirling round, horizontal, or oscillatory, that is, by pulsations or beatings, from the bottom upwards. This variety increased the apprehensions of the unfortunate inhabitants, who momentarily expected that the earth would open beneath their feet, and swallow them up. The rains had been continual and violent, often accompanied by lightning and furious gusts of wind. There were many openings and cracks in the earth; and several hills had been lowered, while others were quite level. In the plains, the chasms were so deep, that many roads were rendered impassable. Huge mountains were severed, and portions of them driven into the vallies, which were thus filled up.

The course of execut vieres was changed; and many application of water opposited to place which had before been

perforde dev.

From the city of Amountan, directed on the count of the Tyrrione See, in lower Califria, propositing sing the weather want to Cape Spaceteents, in upper Calabein, and there along the entern word to Cape Alice, a pract of Lower Calabana, on the Louisin San, the towns and villages, amounting to mently loss hundred, whether so the court or latened, were nither infully distregard, or nelleval greatly he Count Name, the Princess General, and represents of torry thorough of the falmblinum, tout their lives. At Harmore the number of deal imminised to uproved of these thouscomity and Restretion and Polini experienced a similar hors. the total granus of the constaller reconlenged by these swelleyanders, in 164 th and the two Calabrana, was, agree ably to the office of returns, therefore them and three line Head and antiperson, but his William Hamilton thought I will greater, and corres his estimate to tarty thousand,

On the first cluse's of the cardinality, on the fills of tributers, the inhibitement of Meyllo accounty from their tenness, built in the each, and, fullioning the example of their period such shellow on the accolumn. By their chief clus we had have seened and agreement of the 1 near of Alexand, but have to accord with util greatly rendered, they done may but have to accord with util greatly rendered, they done may be also been cluster within the first representation to the pull and to have scaled a many persons on the tenny to be great head, it have scaled a many persons on the tenny to a great head, it has return two streets within the action of the persons of the prime and two tends, who were either as then trace the cluster of the prime at these tends, in the content of the others, or the prime at the stand, where we received at the trace of the cluster, or the prime at the trace to say the charge, or the latest the prime at the trace to say the charge.

The stocks the open the communication of all them tooconducts recomposed, accounted to accord humbreds; and around the regal the of them to be performed the one which temperated on the odd of March. It affected that of the makes possest there is a belong, and the limites part of these Calabria has expectly accommodures with the first takent the object of recording to the first fill in the

green Cooger

phenomena are recorded; at the distance of about three miles from the ruined city of Oppido, in Upper Calabria, was a hill, having a sandy and clayey soil, nearly four hundred feet in height, and nearly nine hundred feet in circumference at its basis. This hill is said to have been carried to the distance of about four miles from the spot where it stood, into a plain called Campo di Bassano. At the same time, the hill on which the city of Oppido stood, and which extended about three miles, divided into two parts: being situated between two rivers, its ruins filled up the valley, and stopped their course, forming two large lakes, which augmented daily.

The accounts from Sicily were of a most alarming na-The greatest part of the fine city of Messina was destroyed by the shock of the 5th of February, and what remained was greatly injured by the subsequent shocks. The quay in the port had sunk considerably, and was in some places more than a foot beneath the water. The superb building, called the Palazzata, which gave the port a more magnificent appearance than any other in Europe could boast, was entirely thrown down; and the lazaretto greatly damaged. The citadel suffered little; but the cathedral was destroyed, and the tower at the point of the entrance of the harbour much damaged. The wave which had done so much mischief at Scylla, had passed over the point of land at the Faro, and swept away twenty-four persons. The accounts from Melazzo, Patti, Terra di Santa Lucia, Castro Reale, and from the island of Lipari, were very distressing; but the damages done there by the earthquakes not so considerable as at Messina.

Sir William Hamilton, from the limited boundaries of these earthquakes, was persuaded that they were caused by some great operation of nature, of a volcanic kind. To ascertain this, he began his tour by visiting the parts of the coasts of the two Calabrias which had suffered most from this severe visitation. He every where came to ruined towns and houses, the inhabitants of which were in sheds, many of them built on such insalubrious spots, that an epidemic had ensued. These unfortunate people agreed that every shock they had felt, seemed to come with a rumbling noise from the westward, beginning usually with the horizontal motion, and ending with the vortical, or

adjusting mation, which had pained most at the lengthings. It had also have growelly observed, that, between a structs, the clouds secured in the freed and quotienties, and that, after a locary abuser of same a date to gravily sold-norm. By the various of same and the clouds, many permitted the mother of the earth as as sides, then the imposition that transfer a direct trans abused the growest and to othe. During a short, the open note to be transfer to a subject their transfer and the present transfer the growest transfer, and give a value amount, to prevent house transfer, and give a value amount, to prevent house transfer, and give a value amount, to prevent house transfer down, and give a value of large sensible at the approach of our halls also be there it is no charge of the concluding at a grower them from their or among at the concluding at a grower.

From Manadespe, No William descended pointles plane and passed many turns and villages in a runned since the one of Mileto, lying in a buttom, was totally distroyed. satisfic a news standing. Among the many complex authorized by these autthornibes, of attornib being ship to I is a liner riner without front, was that of the his a which had remained burious maker a lump of ration at Markama has morey two mays, and were day and slive. He had frequents appreclament a to observe, that the habitation obviously into be growing, but the a cut of a writte and stoom, augrewhen the want, by a literate the contatatorian expland to an there there in the plate, the or il of which is a court way The first were assessmilly levelled with the ground. Dinne also have also i be man sold that a household of a the comments at his out from how differ backets to the arter to the am gameron, the greet weeth the and orminal and problem of the bunds. De allow where, or William engagenes the first impulsion of the with quaka to have enque from the bottom apparely and that ours own the Part, the releasements are only The are ture of the plane basin; as brooks over, the program which are can deap. which peterally discounts ; and the plant seeking rates edicere its former beset, the chair months news rate return and overflow, at the wan that the while degree and the horry promots would do maker my lurge and the moter phills by wilden here rule the mir.

It had been stated, in the reports made to government. that two tenements, named Macini and Vaticano, had, by the effect of the earthquake, changed their situation. In this fact Sir William agrees, and he accounts for it in the following manner: - They were situated in a valley surrounded by high grounds, and the surface of the earth, which had been removed, had probably been long undermined by the little rivulets which flow from the mountains. and were in full view on the bare spot the tenements had deserted. He conjectures besides, that, the earthquake having opened some depositions of rain-water in the clavey hills which surrounded the valley, the water, mixing with the loose soil, and taking its course suddenly through the undermined surface, had lifted it up, together with the large olive and mulberry trees, and a thatched cottage, floating the entire piece of ground, with all its vegetation, about a mile down the valley, where he saw it, with most of the trees erect. These two tenements occupied a space of ground about a mile in length, and half a mile in breadth. There were in the vicinity several deep cracks in the earth, not one of which was then more than a foot in breadth; but Sir William was credibly assured, that. during the earthquake, one had opened wide, and had swallowed up an ox, and nearly a hundred goats. In this valley he saw hollows, in the form of inverted cones, from which water and sand had been ejected violently at the time of the earthquakes, similar to those which had been pointed out to him at Rosarno. As well at the latter place, as in every ruined town he visited, an interesting remark was made to him, namely, that the male dead were generally found under the ruins, in the attitude of struggling against the danger; but that the attitude of the females was usually with the hands clasped over the head, as if giving themselves up to despair, unless they had children near them: in this case they were always found clasping them in their arms, or in some attitude which indicated their anxious care to protect them. How striking an instance of maternal tenderness!

Sir William travelled four days in the plain, in the midst of indescribable misery. Such was the force of the first shock, on the 5th of February, that the inhabitants of the towns were buried in an instant beneath the ruins of their.

house Of the jaministing of the town of Polistone. which was hadly discount become own cisms, subject to overflow three banks, two thousand one homized todayschinds president can set air chancacras. It was finite in that rayment cost deputes and, by the statem median of the sandle, two hope portions of the commit in which is notice subscribbs part of the town, committing of engant hundreds. of house, etent, pertoritional education of the end of the agrees if, to the diseasers of almost links a robot from their extend prolings. What we man extraordinary many of the inhabitement of these homers, who had ration this are no has leap to them, were day out after, and oxenal submit. Person Summer land times described in a paymention of an arms. ion had inhabitants and new to this town, and to the saymer, mades occur of brief countried with their and comptiet des hant for te der aforest and through but ofter latter, aftern is about his in being accommend, community that the tree of and compo were granting to well as it they had been alonged three Other such pierry of personal were by or in the bettern, to an in-threel attention; and others, where, we are conta acceptanced. I we immune particule id land, having turn described approved to each while, tilled the soller, and stooped the enumer of the river, the service of which

Having matters over the rains of Oppido. Six Williams a combine time the words with him of the conflict considers, there is any time weather would have at the conflict considers, which was perate of exactly the name effects as in the extension form Survey, and on a coale infantists yie the. True copy main masses of the place, defected from outs release time as in his year comment from the formation of it measurements, before of the release of the others, given have a some linearies of the place, and we write in extens, while he is not also account to the place of the other twenty made in the continue of the place of the other twenty of the other hard of the continue of the place of the place of the extension of the extension, and other action to the other of the place of the place of the formation of the other of the first of the first of the continue of the other parties of the continue of the other of th

which was probably a portion of the plain, detached by an earthquake at some former period: it was in height about two hundred and fifty feet, and about four hundred feet in diameter at its basis. It was well attested, Sir William observes, that this mountain travelled down the ravine nearly four miles, having been put in motion by the first shock. The abundance of rain which fell at that time; the great weight of the newly-detached pieces of the plain, which were heaped up at its back; the nature of its soil; and particularly its situation on a declivity; in his opinion satisfactorily account for this phenomenon. The Prince of Cariati showed him two girls, one of the age of about sixteen years, who had remained eleven days without food under the ruins of a house in Oppido; and the other, about eleven years of age, who had been under the same circumstances six days, but in a very confined and distressing posture.

Sir William describes the port of Messina, and the town, in their half-ruined state, when viewed by moonlight, as strikingly picturesque. On landing, he was assured by several fishermen, that, during the earthquake of the 5th of February, at night, the sand near the sea was hot, and that in many parts they saw fire issue from the This had been often repeated to him in the Calabrian plain; and the idea he entertained was, that the exhalations which issued during the violent commotions of the earth, were full of electric fire, just as the smoke of volcanoes is constantly observed to be during violent eruptions; for he did not, during any part of his tour, perceive an indication of volcanic matter having issued from the fissures of the earth. He was, therefore, convinced that the whole damage had been done by exhalations and vapours only. In this city, where they had so long an experience of earthquakes, he was told, that all animals and birds are, in a greater or less degree, more sensible of an approaching shock of an earthquake than any human being; but that geese, above all, were the soonest and the most alarmed at the approach of a shock: if in the water, they quit it immediately, and they cannot be driven into it for some time after.

The force of the earthquakes, although very violent at Messina, and at Reggio on the opposite side of the strait,

was not to be consumered to that refinds was tall in the plants. In the popular cars the martalles and may not be moon turnized, it is population of thirty thousand. A way chain communities happened there the, to prove that me imate can access lite tow a long three millions fined. Two males bulinging we the Dake of Belvion, commined under a besquid carrie, the new increasing, and the other mentthere they a few come days where they released their facts. but strank phyntibally, and finally recovered. There were quantization instances of these remaining many days in the same officiality and a law, in language to the British have content, having there clowly along the homesth its and the house, are taken out on the parties were recovered, although as firet it charged but the the this the males, it illd not on he came the come feesly. From three homeones, and from the Asses and, at the pule of Opports, and the large of Continued well no turns octornal interest at the came Costs, it may be and lastert. The long having to always attended with great thurst was a total from of appretitue

A diviging day quarte executing, and which was obserye it throughout the whole come of the part of the Calabet. the province whiteh and been most affected by the entitle peaker, man, that is diverginian of anoth nature, named to graffi, re-ridding what in Lingband are easiled white hall, has low ve, and who is mustly be as the Instanc of the sen, burt of metho and, were, from the seminencement of these convergence or and the in respective state time after, taken much he suctors, and in our b shumbare so to become the come were treat in the present and at prophile wherean, but no down execute, that were ease, and restained amon, the greated columns of films in some of horses been taken, The procee the others of the charge find ron but, he much and a claim trace, and with greater mallier, than he have, the Wishing conference, earlier that the barrow of the est may have been bounded by the entrang free law att it, at has the continual to one or the sorth had driven the fishes. and of these strong holds, in the series way up un ungloc, where he would a half, carlines the grapes on some out of a art to the non-the, by tranging on it with his feet, on ob motion were talls of its edies.

The Cusamanisms of the Climbel of Alexins, wanter

him, that on the fatal 5th of February, and the three following days, the sea, at the distance of about a quarter of a mile from that fortress, rose and boiled in a most extraordinary manner, and with a horrid and alarming noise, while the water in the other parts of the Faro was perfectly calm. This appeared to him to point out exhalations or eruptions from cracks at the bottom of the sea, which were probably made during the violence of the carthquakes; and to these phenomena he ascribes a volcanic origin. He thus attempts to explain the nature of the formidable wave which was represented as boiling bot, and which as has been already noticed, was so fatal to the

14 See William concludes by remarking, that the local mirthquaktus dust, described, appear to have been caused by the man wind of matter as that which gave birth to the Lollan or Lipsti isles. He conjectures that an opening may have been made at the bottom of the sea, most probably between Stromboli and Upper Calabria; for from that quarter, it was on all hands agreed, the subterraneous noises seemed to proceed. He adds, that the foundation of a new island, or volcano, may have been laid, although it may be ages, which to nature are but moments, before it shall be completed, and appear above the surface of the Nature is ever active; but her acts are in general carried on so very slowly, as scarcely to be perceptible to the mortal view, or recorded in the very short space of what we call history, let it be ever so ancient. It is probable, also, he observes, that the whole of the destruction he has described, may have simply proceeded from the exhalations of confined vapours, generated by the fermentation of such minerals as produce volcanoes, which would escape where they met with the least resistance, and would consequently affect the plain in a greater degree than the high and more solid grounds by which it is surrounded.

Count Francesco Ippolito, in speaking of the last great shock of the 28th of March, as it affected the Calabrian territory, is persuaded that it arose from an internal fire in the bowels of the earth, as it took place precisely in the mountains which cross the neck of the peninsula, formed by the two rivers, the Lameto and the Corace, the former of which flows into the Gulf of St. Euphemia, and the

of moule the overhead like the other checks, it cause in amuthment direction, the earth at this indulated, there shoot, and finally minimal mand-lin in such a drawns, that it and emprely possible to statut. It was appropried by a which was of the came devalues with the shock, reconstruct and with a head means like that all this variations of a mean. A serve thrapping and companied out only the shock of that might, and of the autocorting day, but liberator all the rate. ers which were afterwards felt to at the owner those that the course was continually shaken, at first every five migracy, and admirporally each quarter of an liner. During the sight, there were used in time from the ground in the as charminant of Regen, towards the out, to which the eaglication estimated, temporarelistical many of the presents was many thought from . How there thered precionly Book examilarmeter we will at the many country bright and land town possessed. After they great should there appeared ed to the on, in a darting direction, and town to the cost, a whilely theory, co-military electric fire in wise even for the agreem of twen becomes.

Assembly talk were either decided as landstovel; and with he flowered as a three-city spectrum was made, is no which a present quantity of water, presenting either transactions as more concentrations, to from the rivers adjected to the ground time broken up, opented for about 1 hours. I may be control from the con, there exertisely of Borne, and about a safe from the con, there exertisely of Borne, and about a star, which for exercisely about a better quantity of safe water, which for exercisely assembly the instituted the institutes of particles and the inspections of the internal from the appropriate and in the particles of Marie and the water quarter, alternative water the explanation in the particle, the first winds of a toward particle and the form of as invented game, water, water, and within anymost to preven the example of a flock of abotter than

Arriel the exposuration among a both matter presented to influenced this particular shock, the following are well described of matter. The experience of a wall as blanks, which was not an expellent operator, was already, but before the land, with a discount of a continuous, with a discount of a continuous discount, that is continuous experiences are continuous, with a discount of the continuous of the con

zaro, the water of a well, which before could not be used, on account of its possessing a strong smell of calcination, became potable. For a long time before the earth shook, the sea was considerably agitated, so as to terrify the fishermen, at the same time that there was not a breath of wind. On the side of Italy, the volcanoes had not emitted any eruptions for a considerable time before; but in the same way as, during the first great shock, Etna was in flames, so Stromboli emitted fire during this last.

EARTHQUAKES IN PERU, &c.

South America has been at all times very subject to carthquakes; and it is remarkable, that the city of Lima, the capital of Peru, situated in about twelve degrees of south latitude, although scarcely ever visited by tempests, and equally unacquainted with rain as with thunder, and lightning, has been singularly exposed to their fury. They, indeed happen so frequently there, that the inhabitants are under continual apprehensions of being, from their suddenness and violence, buried beneath the ruins of their houses. Still they have their presages, one of the principal of which is a rumbling noise in the bowels of the earth. heard about a minute before the shocks are felt, and seeming to pervade all the subterraneous adjacent parts. This is followed by the dismal howlings of the dogs, who seem to give notice of the approaching danger; while the beasts of burden, in their passage through the streets, stop suddenly, as it were by a natural instinct, and seek the attitude which may best secure them from falling. On these portents, the terrified inhabitants flee from their houses into the streets, forming large assemblies, in the midst of which cries of children are blended with the lamentations of the females, whose agonizing prayers to the saints increase the common fear and confusion. In a word, the entire city exhibits a dreadful scene of consternation and horror.

Since the establishment of the Spaniards in Peru, the first earthquake in this capital happened in 1582; but the damage it did was much less considerable than that of some of those which succeeded. Six years after Lima was again visited by an earthquake, the results of which were

and control, that it is still anticounty manuscrimeter of consens. In 1624, a third convenient them share them, houses and on the 17th of Coronabur, 1630, so much summer are done by an earthquake, that is substantically marked be also as known been specify demolished, a marked be also as that day assumely colorated. The the 3d of November, 49 as, the mass standy attracts by Linea, and a great number of houses, were declarated by a visible even; thus the inhabitation having land thanky pre-agree withdraw themselves from their houses, themselves that the parasters! In 1675, another themselves to manuscribe the parasters!

Among the prost frommeliers carriequides with which the Perioding equital free good smillent, mile by exchanged that which happy per on the with at 1 sendar, 1847 . The area shock was at fine to the unitality, when toward in the pairs public landlings and himser aire descriped, with the the of brong floor. This was, however, morely a prelucin what billioned, On, two hours after, a ground when he tion with with any to transportation approximate, that all was find In rustin, and every stear opening of property lies. Clarine this exceed the k the our setting i undidensity, and then commend to assessment waves, namely everything I allow, the un part of I ima, diatung five notice, so not no the adjacent country, together with the northest falsoblicome. I com their stere six after constiquition presently or Lines, principle that or 17ads, which likewise happened on the Wale of Chenday, at built page ton at signly. The marky man making were in values, that in the space of money has water than three manages, the greater was if an all the and times to the cuts were distoused. has any under their more duck at the intestituate or had not made antihaven the the effects well englaces, the truly places of energy, At largers the landble effects of the high stock consent, has the consentity one of short distances the concentions sorted was willing each other. The fort of Cullin was distributions, but when this builting authored from the sarthquake, and the annaberatile when compared with the described a tax region of the bollingers. The way in the country my and to a commune, one nation we of examinity while all office in comment to standiturate graves, towards with the elitoure of the articline, and antibouty bosses Collegered the nout bouring country in its flood. This, however, was not entirely effected by the first swell of the waves; for the sea. retiring still farther, returned with greater impetuosity, and covered not only the buildings, but also the lofty walls of the fortress: so that what had even escaped the first inundation, was totally overwhelmed by these succeeding mountainous waves. Of twenty-three ships, and vessels of light burden, then in the harbour, nineteen were sunk; and the four others, among which was a frigute, named the San Firmin, were carried by the force of the waves to a considerable distance up the country. This terrible inundation extended, as well as the earthquake, to other parts of the coast, and several towns underwent the fate of Lima. The number of persons who perished in that capital, within two days after the earthquake commenced, on an estimate of the bodies found, amounted to thirteen hundred, beside the wounded and maimed, many of whom survived their tortures but a short time.

The earthquake of JAMAICA, in 1692, was one of the most dreadful history has had to record. In the space of two minutes it destroyed the town of Port Royal, and sunk the houses in a gulph forty fathoms deep. It was attended with a hollow rumbling noise, like that of thunder. less than a minute, the greater part of the houses, on one side of the streets, were, with their inhabitants, sunk beneath the water, while those on the other side were thrown into heaps, the sandy soil on which they were built rising like the waves of the sea, and suddenly overthrowing them on its subsidence. The water of the wells was discharged with a most vehement agitation; and the sea was equally turbulent, bursting its mounds, and deluging whatever came in its way. The fissures in the earth were in some places so great, that one of the streets appeared of more than twice its original breadth. In many places the earth opened and closed again; and this agitation continued for a considerable time. Several hundreds of these openings were to be seen at the same moment: in some of them the wretched inhabitants were swallowed up; while in others, the earth suddenly closing, caught them by the middle, and thus crushed them to death. Other openings. still more dreadful, swallowed up entire streets; while others, again, sponted up cataracts of water, drowning there within the westing about quient. The whole was structed with a great majorne stonets. The thundre two the distant follow manufactor, the ally assessed with a range whathe honour to the wene. This decodful column harving reserve, the which colonial exhibited a proper of the business Firm make liminer which had put from agaillanced the west bit countries; and whatever gow on the place. none dornel in the massered cone. The entremed speed core may converted into hogo pouls of water, which when closed up he the way, left an many plants of bacton annal. water, two a charked by the fullage in of the detectant manso of appearments ; and it was not until south time offer; that they quite thousands to me Manuel The maintains win to have here more particularly exposed to the time of the first eremembers about and it was consecutively this the principal and at the consecount was among them. Sinch as the informations as work crowd, single shocker up handy the Sign in the lardoner, and remained there upone two according the slees he continuing during that interval with more or two violation every day.

BARTHRITANDA IN YENESHOLA.

the classified Murch, 1812 hope on the and has per a some archives, which has then to there there exists needly quality, which them then to there then while provides, the my amount and filters second the earth was now colored in exercising and many twenty themselves the man and second the court them pulses and the virtues. The remains of Caronoma, La tension, they was to the description of the provides of the color of the provides of the provides of the color of

procession; and many churches, and the principal barracks at Caraccas, being thrown down, there was a considerable number of soldiers killed, and many thousand persons crushed under their ruins. The arms and ammunition destined for the defence of the country were buried in a similar manner; and what was worse, an unconquerable enemy to the independence of Venezuela seemed to raise its head from among the ruins—that religious prejudice which the earthquake inspired.

In an era less remarkable, a mere convulsion of nature would have had no influence on a new government; but, notwithstanding the prosperity Venezuela then enjoyed, the seeds of discontent had fallen on one class of the community. The principles which formed the basis of the new constitution were democratical, and it had been necessary to deprive the clergy of some of their privileges, which of course created enmity in their minds to the present government. Immediately after the earthquake, the priests proclaimed, that the Almighty condemned the revolution: they denounced his wrath on all who favoured it; and a counter-revolution, attended by great bloodshed, was the unhappy consequence.

CONNEXION OF EARTHQUAKES WITH VOLCANOES.

ISLAND OF JAVA.

THE connexion of earthquakes with volcanoes has been already noticed; and a remarkable instance of an occurrence of this nature is recorded in Ruffles' History of Java. Papandayang was formerly one of the largest volcanoes in that island; but in the month of August, 1772, the greatest part of it was, after a short but severe combustion, swallowed up by a dreadful convulsion of the earth. This event was preceded by an uncommonly luminous cloud, by which the mountain was completely enveloped, and which so terrified the inhabitants dwelling at the foot and on its declivities, that they betook themselves to flight. Before they could all save themselves, however, the mountain began to give way, and the greater part of it actually

to M it and disapported in the cash. At the case time, a presentation time, were heard, recombing the discharge of the housest commen, while the impresse question of reference which were thrown out, and express in every direction, propagated the affects of the explanation through the opene of pump railes.

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There are in local thickness of large analysis, which although they differ more each other in extensal fiction agree in the general arithment was along, by their lay may a heard heavy which gradefilly counts to worth the convents, to the men in a case. The continue is a sound front their feeling and a consultation of the different and a convention, at a document, a case may only be the consequent for one of the continue of the form of the continue of the form of the continue of the form of the form of the form of the form. Although it is the continue that are of the form of the form. Although its first interesting contribution of the continue of

from the progress of vegetation, and from the depth of black mould which covers its sides, its interior has continued in a state of uninterrupted activity. Its crater is large, and has, in general, the shape of a funnel, but with its sides very irregular: the brim, or margin, which bounds it at the top, has also different degrees of elevation, rising and descending along the whole course of its circumference. This may be estimated at a mile and half; and the perpendicular depth on the south-side, where it is very steep, is at least two hundred and fifty feet: towards the west it rises considerably higher. The bottom of the crater has a diameter of nine hundred feet, but is not regular in its form, which depends on the meeting of the sides below.

Near the centre it contains an irregular oval lake, or collection of water, the greatest diameter of which is nearly three hundred feet. The water being white, it exhibits the appearance of a lake of milk, boiling with a perpetual discharge of large bubbles, occasioned by the development of fixed air. Towards its eastern extremity are the remaining outlets of the subterraneous fires; consisting of several apertures, from which an uninterrupted discharge of sulphureous vapours takes place. These vapours rush out with an incredible force, with violent subterraneous noises, resembling the boiling of an immense cauldron in the bowels of the mountain. When at the bottom, the force of the impression made on the spectator by this grand and terrific scene, is increased by the recollection of the dangers he had to encounter in the descent; while the extent of the crater, and the remains of the former explosions, afford an indescribable enjoyment, and fill his mind with the most awful satisfaction.

The explosions of mud, called by the natives bledeg, are a great curiosity. This volcanic phenomenon is in the centre of a limestone district, and is first discovered, on approaching it from a distance, by a large volume of smoke, which rises and disappears at intervals of a few seconds, and resembles the vapours arising from a violent surf. A dull noise, like that of thunder, is at the same time heard; and on a nearer approach, when the visions is no longer impeded by the smoke, a large hemispherical mass is observed, consisting of black earth, mixed with water, about sixteen feet in diameter, rising up to the

magnitud twenty is finely first in a poster dy regular man. now much no it waste, quadrating by a rosser becomes to mere on theirly regimes with a dult mover, and continue, my every decoupling a viduano of burn most. After an innertal of a too contends, the because prince least of neith inmust something at the straight of the come standard office up a plo relay loody at mad, and it goostay a with con- inthrough the semidalnessing photo. The open wheat its its affirm mouse to ment, theather and south its brand, and to make the engaged with the earthy with him management although warre, which are thrown up town today. The streamfor me may be continued at anoun half a mile. To pater to compliant this safe water to the elections of many dines with a large and an in the lower manifest many to sail well-, for in the ground, for the parpose of reago-James. The and county dission up, property a degree of least general than that at the universality appropries with the extreme half area languagement of the larger from which is interrupts the east o of that come country epaths informer, and open its appeals in the percent que at the momentum system standard amount of the

The remarkable vidence with which names much the appropriate of soft and in the server grows, will be here an complete of try the following dotaths of the extended by cay one? a tile a presidency little memorale so has be accommonated the countries was of the Technical menutions to the colored of limiteness. no of the Inchine chase, The organian, which have your diet hipsel, there, was crimitale talk were then refuse use the Atlantina learning worm there, uniformly a completential corelan of Cololon, Surveyers and Horgery, to a chemistre. the the three and states their group by contact, by their some our received and same a representation a solution within the mater at the state framewhat was my ambouring it specto of three foundard butter assured to, it produced the islent toconstant offices, and s court the most almendes appear willwere It. Jose, at the discourse of the or tenentpay within, commend to be gotally personal. Lin the minute expect of research of the gradient of each or the own was and amount

in an atmosphere, the "palpable" density of which it was unable to penetrate; showers of ashes covered the houses, the streets, and the fields, to the depth of several inches; and, amid this darkness, explosions were heard at intervals, like the report of artillery, or the noise of distant thunder. Every one conceived, that the effects experienced might be caused by eruptions of some of the numerous volcanoes on the island; but no one could have conjectured, that the shower of ashes which darkened the air, and covered the ground of the eastern district of Java, could have proceeded from a mountain in Sumbawa, at the distance of several hundred miles.

The first explosions were heard at Java, on the evening of the 5th of April, and continued until the following day, when the sun became obscured, and appeared to be enveloped in a fog. The weather was sultry; the atmosphere close; and the pressure of the latter, added to the general stillness, seemed to forebode an earthquake. This lasted for several days, the explosions continuing, but not with so much violence as at first. On the evening of the 10th, the eruptions, however, were more loud and more frequent; ashes fill in abundance; the sun was nearly obscured; and in several parts of the island a TREMULOUS MOTION OF THE EARTH was felt. On the following day, the explosions were so tremendous as to shake the houses per-

ceptibly in the more eastern districts.

In the Island of Sumbawa itself, there was a great loss of lives, and the surviving inhabitants were reduced to extreme misery. It appears from the account of the Rajah, who was a spectator of the eruption, that on the evening of the 10th of April, three distinct columns of flame, all apparently within the verge of the crater of the Tomboro mountain, burst forth, and, after ascending separately to a very great height, united their tops in the air. whole of the mountain now appeared like a body of liquid fire, extending itself in every direction. Stones and ashes were precipitated; and a whirlwind ensued, which blew down the greater part of the houses in an adjoining village. It tore up by the roots the largest trees, and carried them iuto the air, together with men, horses, cattle, and whatever came within its influence. The sea rose nearly twelve feet higher than usual,—a phenomenon commonly attendour on corclematers, avery beliefue the identification of the and surreging away hornes, with whatever came within its cents. It is real-placed that smaller throughed individuals neighbol. The the and herhold of every description, along the whole of the gooth and wen older of the genus ala, meter completely antenved, with the exception of a had point of hard must the sout where the sillage of Tour

The extreme mixers to which the inhibitions of the weatern part in the island were reduced, was desalted in habitate. The mosts were stronged with deal to the the withings were aliana carriedy descreed, and the beams table on home. The promises monitored in all affordance to core is at lived , unit the families become on every, that more of the damplity of in the Hamb other of langue.

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BASALTIC AND ROCKY WONDERS.

THE HILLARY HATTANAY.

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This grand arrangement extends nearly two hundred yards, as it is visible at low water; but how far beyond is uncertain: from its declining appearance, however, at low water, it is probable that it does not reach beneath the water to a distance equal to that which is seen above. The breadth of the principal causeway, which runs out in one continued range of columns, is in general from twenty to thirty feet: in some parts it may, for a short distance, be nearly forty. From this account are excluded the broken and scattered pieces of the same kind of construction, which are detached from the sides of the grand causeway, as they do not appear to have ever been contiguous to the principal arrangement, although they have been frequently comprehended in the width, which has led to such wild and dissimilar representations of this causeway, in the different accounts that have been given. Its highest part is the narrowest, at the very spot of the impending cliff, whence the whole projects; and there, for about the same space in length, its width is not more than from twelve to fifteen feet. The columns of this narrow part incline from a perpendicular a little to the westward, and form a slope on their tops, by the unequal height of their sides; and in this way a gradual ascent is made at the foot of the cliff, from the head of one column to the next above, to the top of the great causeway, which, at the distance of about eighteen feet from the cliff, obtains a perpendicular position, and lowering from its general height, widens to between twenty and thirty feet, being for nearly three hundred feet always above the water. The tops of the columns being, throughout this length, nearly of an equal height, form a grand and singular parade, which may be walked on, somewhat inclining to the water's edge. from the high water mark, as it is perpetually washed by the beating surges, on every return of the tide, the platform lowers considerably, becoming more and more uneven. so as not to be walked on but with the greatest care. At the distance of a hundred and fifty yards from the cliss, it turns a little to the east, for the space of twenty or thirty yards, and then sinks into the sea. The figure of these columns is, with few exceptions, pentagonal, or composed at ave some, and the spectator man look view increasity asteroite that any of a different construction, has ing three, non, or all ables. What is very commercially, and pacifically carloun, is, that there are not two collected in test thousand to be found, which cutter have their ables report among themselves, or display a like figure.

The composition of these columns, is pillars, is not less descriping the attention of the suctions always. They are out of one with those he are operated procition, but conquest. at several short lengths, nicely foiled, not with this carthere, and settle white in the matter that a hall and withing of the the feders in the considera of amo of the land kind of 8th, the ame at the point having a cavity into which the courses and of the appointe is exactly fitted This is not wishly only a no disjourning the two corners. The stigals of the countrity occurrency to generally about three or from makes. It is will together remorehable, that the concoulty and correspondencementality of the point, are mitcontourable to the esternal vagatar figure of the relains, the markly treated, and an larger as the wise or despected of the column will admit; enougherativ, as the angles of these columns are in general very unequal, the elecular silve of the green are collins rotation with more than post on those takes of the pennipulat, and me, from the , the at the car after part of the point to the externe date. and angles quite plans. It can a liber so be be neglecture. and while a minute of the fire and attitudes of these bands are Requirely accorded, in some in them the come city being generally in others the resonant This me when her the have and outstore of competition and consection on the way of the confinement which is admirable throw them the planting in one of the inflictly delications and the contract of the product of large, with respect to the amoder, of ristors.

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sign, except in the form of the joint, which is invariably by an articulation of the convex into the concave of the piece next above or below it: nor are there traces of a finishing in any part, whether in the height, length, or breadth. If there be particular instances in which the columns above water have a smooth top, others near them, of an equal beight, are more or less convex or concave, which shows them to have been joined to pieces that have been washed away, or by other means taken off. It cannot be doubted but that those parts which are constantly above water have gradually become more and more even, at the same time that the remaining surfaces of the joints must necessarily have been worn smoother, by the constant action of the air, and by the friction in walking over them, than where the sea, at every tide, beats on the causeway, continually removing some of the upper stones, and exposing fresh joints. All the exterior columns, which have two or three sides exposed to view, preserve their diameters from top to bottom, it may be inferred, that such is also the case with the interior columns, the tops of which alone are visible.

Notwithstanding the general dissimilitude of the columns, relatively to their figure and diameter, they are so arranged and combined at all the points, that a knife can scarcely be introduced between them, either at the sides or angles. It is most interesting to examine the close contexture and nice insertion of the infinite variety of forms exhibited on the surface of this grand parade. From the great dissimilarity of the figures of the columns, the spectator would be led to believe the causeway a work of human art, were it not, on the other hand, inconceivable that the genius or invention of man should construct and combine such an infinite number of columns, which should have a general apparent likeness, and still be so universally dissimilar in their figure, as that on the minutest examination, not two in ten or twenty thousand should be found having their angles and sides equal among themselves, or those of one column to those of another. As there is an infinite variety in the configuration of the several parts, so are there not any traces of regularity or design in the outlines of this curious phenomenon: including the broken or detached pieces of a similar structure, they are extremely

natived and continuit. Whatever may have been their mount appear to have any consection with the grand or principal consecutor; and on any appearable risings as one in ter first construction; and of their design can be interest from the types or position in the event constitution passe.

The elife, at a great distance from the ourseway, we him to many just's similar columns. At the depth of men or toute a feet from the summer of the cape of Because the and begins to a summer redunder tendency, and terms of many at make pullars of handle, which amust prepared who to the line busy, presenting to the sharp then of the persmonthly, the approximation of a magazine substy to rad smeate, appropriate of alvey two to heavile. The colomnado is supported on a subdition of source, that h, arounder could while order that the he abundance to like and the holes of but, through comparationly compular, it exhibitely affects of peculiar report, together in many places to run into course forms, preventiting the discussing of sults and many infer columnum during a least expanillmation. Remark stan provided of comment stands a second range of pillars from buty to hity from high, more exactly domined, and sombaling in the nearest of the reducine, there is the Chart of house way. This tower takes is upleasurely a byear of east order stemm, which appear as a rolled to show it to greatly whent-The two admirants amount call-non, attledge mosper oper memory of long splant parts, from a purposable ulgar hereby of mon hundred and occupy her, from the box of which the immunities enough with met and trace, shapes done in the ore a considerable space, as a to give an sufficient langle of the hundred wer, eaching in all accordy have hamilton her of propositionalist alexaction, and presenting o more, which his termining and survey of indicating, his offpears and mirelly of attraypressed, and for the actionalmany competition of the objects, comment, provinges, to rivolited

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sompe.

gigantic columns lies a wild waste of natural ruins of an enormous size, which, in the course of successive ages, have been tumbled down from their foundations by storms, or some more powerful operations of nature. These massive bodies have occasionally withstood the shock of their fall, and often lie in groups, and clumps of pillars, resembling artificial ruins, and forming a very novel and striking land-

Many of these pillars lie to the east, in the very bottom of the bay, at the distance of about one-third of a mile from the causeway. There the earth has evidently fallen away from them upon the strand, and exhibits a very curious arrangement of pentagonal columns, in a perpendicular position, apparently supporting a cliff of different strata of earth, clay, rock, &c. to the height of a hundred and fifty feet. Some of these columns are from thirty to forty feet high, from the top of the sloping bank beneath them: and being longer in the middle of the arrangement, shortening on either of the sides, have obtained the appellation of organs, from a rude likeness in this particular to the exterior or frontal tubes of that instrument. As there are few broken pieces on the strand, near this assemblage of columns, it is probable that the outside range, as it now appears, is in reality the original exterior line towards the sea; but how far these columns extend internally into the bowels of the incumbent cliff is unknown. substance, indeed, of that part of the cliff which projects to a point, between the two bays on the east and west of the causeway, seems composed of similar materials; for, besides the many pieces which are seen on the sides of the cliff, as it winds to the bottom of the bays, particularly on the eastern side, there is at the very point of the cliff, and just above the narrow and highest part of the causeway, a long collection of them, the heads or summits of which just appearing without the sloping bank, make it evident that they lie in a sleeping position, and about half-way between the perpendicular and horizontal. The heads of these columns are likewise of mixed surfaces, convex and concave: and they evidently appear to bave been removed from their original upright position, to the inclining or oblique one they have now assumed, by the sinking or falling of the cliff.

REAGAILY TO PRESIDENT.

In the country invested of Pailog, in the State of Vanctor, their are covered to thought conditions, similar to there of the Claus's Conceway, although law majorities in appreciation. Sport seven with it a southern distribution, from that wity, is a hill immer! Should Rosen, or the Red Minnewity, is a hill immer! Should Rosen, or the Red Minnewity is a hill immer! Should request in the Red Minnewity is a hill immer! The country of the country of the property of the Country of the C

At an haconah cable distance is noother totalita bill, willed If month that I Hamilton, on the Decil's 1911, along the takes of which polynomic columns are arranged in no obhave greatiled. This conservery extends along the side is the rate tenench, words with the wine presignment of the solvene or a logilary don the full. Although the adminis-I have these title are of the couple, or implicited kind to will they differ very remarkably from much other to many respects, but principally in their terms, and in the teamer and qualify of their reach. Those of the Monde del Die value commonly approach a circular form, as much in no there much a will others; which is also one reach in the column. of the Gorge's Concerns; and of most oring beautygroupe On the cournery, there is Slonge Rose commitno alifang or and hours. The columns of the former man may, once with the other, much be a had really merce, you saw has thele in their new, while those of the farme present in to age it saving in their dimension, the danger if age of rocked; their common while may be a dimension of the ar explic parties. They differ, there some any considerably in sec. from three of the Count's Catenany, compact which musmere two rese to watche. 'Dur handle of the colonica of the Mounts del Diarrilo content to the equipment, as they present their amounts only to the year their consoliting parts are despite here's in the full, and in some phones carriedly to Chemin of Aleman Bearing to his no they are weether, make how as to right on ten how in hulghin on his his

siderable size when compared with the height of those of the Giant's Causeway. The columns of the Venetian groupes display, however, all the varieties of prismatic forms, which are observable in those of the latter, and other similar groups. They are usually of five, six or seven sides; but the hexagonal form seems chiefly to prevail.

The texture and quality of these columns are not less different than their forms. Those of the Monte del Diavolo present a smooth surface, and, when broken, appear within of a dark iron-grey colour, manifesting also a very solid and uniform texture; in which characters they correspond with the columns of the Giant's Causeway, and those of most other basaltic groups. But the columns of Monte Rosso are in these respects very different, they having not only a very rough, and sometimes knotty, surface. but displaying likewise, when broken, a variegated colour and unequal texture of parts. They are commonly speckled, more or less distinctly, and resemble an inferior sort of granite, of which Monte Rosso is itself formed. and which serves as a base to the range of columns in question. It is, in general, not quite so hard as the Alpine and Oriental granites, and is sometimes even friable. This species of granite abounds in Farmer, where large tracts of it are to be seen in the adjoining provinces of Auvergne, Vivarez, and Lionnois. But it is still more common in Italy, seeing that, besides Monte Rosso, the bulk of the Euganean hills, of which that is a part, principally consists of it; and these hills occupy a considerable tract in the plains of Lombardy. It is also common in the Roman and Tuscan States; and of this substance the mountain close to Viterbo, on the road to Rome, is entirely composed. The columns of Monte Rosso appear; therefore, of a different character from any hitherto described by mineralogists, who mention those only of an uniform colour and texture. But the great singularity here is, that such a range of prismatic columns should be found, bedded as it were, in a mass of granite, and composed nearly of the same substance. An instance of this kind, relative to any other causeway, is not recorded; and this circumstance seems to render that of Monte Rosso, in one respect at least, more curious and singular than the celebrated Giant's Causeway is known to be, from the regular articulation of



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an ecolumn. It is certain, that the bounded promp of from the Roses is the only highly comes in twell, but increasing on account of the great light if throws an the original

entitle in retreat.

It is the wive comunicable, that the columns, to the two groups of Magte Roser and Monte del Diavolo, preserve respectively the same position, nearly panelled to cook subsert which is not unually the reas in baseloc pro-que. For, although the property overcounts of wheals the balance Commune to formed, regards in a chreetton proposedurates to the horizon, still other sprell detected proups of our mino also somes un the emphise abuse, amongs us their profition of the corps degrees in alliques. A among the minorana laurater latte of Austrana and Vilas in Prairie. ple agreemen which some its should in those peris there many than in any other part of barrage, and, perioge, or the honour plate, a truck to a sor any amon than to see the side pune of the same server by my in all possible directions, as becoming a clause at the private of a gaze of common chrystal. Son is this purkey of position as abservable his stagic columns as in whate may us or you jet of them, that edien ja com thomasies an the same fill, disputed in diffwent create to stages, as it were, one there the arker, many of these assuming very different, and even expanse directions. The insures at the Might del Diamite and and new for which in soft and another than the first on many pairs of the fall, along an actions connect all is presented. have not the their repear leverally on a line of handle with the a miller motion. Stationer to more transmitted to the program and because above manches of them in an inand layers and a character, which precoud the except of an analysis. we where the inter, often a think was after distant totrooms the in the man delice to better the region, it the compact ante can be either oil, a large pate or angels or elich wood. At through the exhibition sever (thromain of Mean Roser to the commit to receive in it disposits in manda any one while will office groups of column have standard love my with while one and party is the mentioned and expenses in welvers, however the rong otherwise littles leaves there of There there, at well as their the assumes breakly

NATURAL BRIDGES.

NATURAL BRIDGES OF ICONONZO.

[See Plate, No. 34.]

Amid the majestic and varied scenery of the Cordilleras of South America, that of their valleys most forcibly strikes the imagination of European travellers. Their enormous height is not discoverable but at a considerable distance. and while the spectator is on one of those plains which extend from the sea-coasts to the foot of the central chain. The flats, or table lands, which surround the snew-clad summits of the mountains, are themselves, for the greater part, of an elevation of from seven to nine thousand feet. nearly a mile and three quarters, above the level of the This circumstance diminishes, to a certain degree. the impression of greatness produced by the colossal masses of Chimborazo, Cotopaxi, and Antisana, when seen from the flats of Riobamba, or from those of Quito. It is not, however, with the valleys as with the mountains: deeper and narrower than those of the Alps and the Pyrenees, the valleys of the Cordilleras present situations still more wild than these, and more adapted to fill the soul with admiration and with terror. Fissures and chasms present themselves, having their bottoms and sides ornamented with a vigorous vegetation, and of such a depth, that Vesuvius and the Puy-de-Dome might be placed within several of them, and not show their summits above the edge of the neighbouring mountains. In passing along the back of the Andes, from Pasto to Villa d'Ibarra, and in descending the Loxa towards the banks of the river of the Amazons, the traveller reaches the celebrated fissures of Chota and Cutaco, the former of which is nearly a mile, and the latter upwards of three-quarters of a mile, in perpendicular depth. To give a more complete idea of the grandeur of these geological phenomena, it should be observed, that the bottoms of these fissures are by one-fourth only, less elevated above the level of the sea, than the passages of St. Gothard and Mount Cenis.

The valley of Icononzo, or of Pandi, is less remarkable

for the differentiation, from the the pergentializers become at its conder, which appear to the disped by the frame of man-There are a raid harrest atments to me the news for turnespeconstraint with the pure of the a and incharge our engetables. which cover the edges of the fi-one. The little torsent which has wentered treate a processe thereigh the tallow of Incomment, home the name of this de & Zumian Pas-Amenda from the motor or born at the Amber, which with the Granden of New Firmous, agreeated for tours at the elegent that time from the epos plants at the toll, have where, and Donners. This current, confound polytics a part almost increased the could not leave been assent with a many difficulties, bed on Nature beredt bombel 7 we nego end or rateria, which are justly re-needed to his commercial Charge the absents and words to the stream of casel. long. The address participa are on the route them for en-Fir He Champo to Parent an and Uniter.

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The despectation through which the terrent of shipped that promptation (cold), to capital the remove of the reality of forestern. The first is available, it almost in the relation from the other as the result in the promptation of a sales, a almost in the man of the time there is expected to sales, a ship contains from a the time is necessary to the real to be a series of the removal the west of Dong and the other is consequent to be a sale of the removal the sales of the removal three the sales of the removal three the contains the removal three the sales of the removal three thre









The elevation of the bridges of bronouzo—these surprising predictions of nature—above the level of the ocean, two throusand sweet hundred feet, somewhat more than 1 starf a unite. In concluding his description of than, M. Humboldt natived sweetal other natural bridges, strong thick is that of Cohestrock, in Viegmin. It is an arch of missione, having an operator of missis frets, and an elevation of two fundred and twenty feet above the level of two water of the entire of the considers this, as well as the arising of corth, railed Ramichaea, which is on the declaration of the considers this, as well as the arising of Makin do Dine, wanned Dantian, in the South Vinter as presence of Los Pastos; ingether with the bridge of Makin do Dine, wanned Dantin, near Transition in Mexico; and the perforated rock near Grandola, in the prevence of Aleuten, in Portugal, as geological manners, which have some seculibrate in the natural ford one of besome as a besone we call the daubtes whether, in any other careful of the world, directless yet been discovered an accidental arome-ments of them and the process of some builton, respectively exchange each other, force of the whitch, temperaturely exchange each other, force

See Photo No. 2014.

a natural eren-

This National Relates is the critical by Mp. Jefferson, date of the United States, as one of the most audient of the United States, as one of the most audient of the productions of nature. It is on the assess of a bulk other seems to save how eleven through its beauth by some great consolition. It is in height two humans and thirteen feet, about fifty best in breath at the bostons, and at the engenies part about marts feet. The presence over it is about sixty keet in width, and the thickness of the mass at the mount of the area about tarty fiert. A profition of this hickness is constituted by a test of earths, which affords growth to many large trees. The reason-

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with the hill on both sides, is a solid rock of lime-stone. The arch approaches the the semi-elliptical form; but the larger axis of the ellipsis, which would be the cord of the arch, is many times longer than its transverse. Although the sides of this bridge are provided in some parts with a parapet of fixed rocks, yet few persons have sufficient resolution to walk to them, and look over into the abyss. The passenger involuntarily falls on his hands, creeps to the parapet, and peeps over it. Looking down from this height, for the space of a minute, occasions a violent headache. If the view from above be so exquisitely painful as not long to be borne, that from beneath is delightful in the extreme. It is impossible for the emotions arising from the sublime to be felt in a greater degree than at this spot. The rapture of the spectator cannot be described, when he surveys an arch at once so beautiful, so elevated, and so light, springing up, as it were, to heaven!

This grand natural briege is in the county of Rock-bridge, to which it has given name, and affords a public and commodious passage over a valley, which cannot be

crossed elsewhere for a considerable distance.

PRECIPICES AND PROMONTORIES.

BESSELY GAUT.

The precipitous pathways which frequently occur in the Indian Appennines, a chain of mountains extending along the Western or Malabar Coasts of the Peninsula, are called Gaurs; and of these abrupt and perpendicular precipices, Bessely Gaut is considered as the most romantic. It is admirably described in the travels of Lord Valentia, from which the following particulars are extracted.

On entering the defiles of the chain of mountains by which the table-land of Mysore is separated from the low country of Canara and Malabar, the scenery becomes extremely wild and romantic. Having reached Puraeah Chuttoor, situated on the summit of this celebrated Gaut, his lordship began his descent at three in the morning, by a road formed with great labour out of a bed of loose rock, over which the torrents of the preceding winter had

mit with and himse, on the ounts away all the native parts, and in apparent places in leave emple for he, of time or bye fore disputes, showing in the course of the court, and rose more than too first assurder. He all, little it from his palane. man to admire the arthrutty of the evene, and universe a furnit of the largest thriental trees, several at which were one lamintary tiers to the otem bulines a comple lamints ratendent stools, matwhitercourses which the descent was no every, that he was requestly can a tend with their near, at me squall is distance as to be able to obstanguards them, by the the any of the memoranes torolers by which the mady was and committed, but which were positiveen to calledness the informationless energy of tules of which the miles committed the test of henvin, it the deep glaim of the above the which he appropried to discount for the stay once the same could not leave twee bail' or angular in assembly our. The descent any important by miles force designs of many philis were executive the binne.

As been, it wise on operator, in a clouding part of the orang displaced the half momentum that party best descended, reversed with touche menty to be moment. They possed a consil corner with touche menty to be universe, and harmonic a consil corner. The intermediag respections was clearly to make the formation of the formation of the buildess trace developed by plaints of the quantities of the limiters been descent as a mail without in the presented time. The industriants of a mail without in the present of the intermediate formation of the party of the intermediate of the complexed in three-ling their grain to a budy posterior of the formation of their states of the area of the orange of the contribution of the party of the discontribution of the party of t

THE NAME OF THE PERSON

The newspaper of Manking, in the Creams, but a very structured in the property of the continuer property of the continuer of the character of the continuer of the continuer, who is, from the the continuer, of a distribute of a content propositional of the continuer, of the continuer of the cont

of conveying the necessary materials for the completion of so astonishing a work, the Genoese constructed this citadel, perhaps without a parallel in Europe, the result of their wealth, address, and enterprise. Being at a remote distance from the coast, it is natural to conjecture that it was employed to curb the hostile spirit of the natives towards the maritime colonial possessions. The latest possessors of this fortress were Jews, in the cemetery of whose colony the traveller meets with ruined tombs of marble and stone, lying beneath the trees he has to pass in his ascent.

The whole of the passage up the mountain is steep and difficult; nor is it rendered more practicable by the amusing labours of its original possessors, whose dilapidated works occur almost at every step. On reaching the summit. caverns and gloomy galleries, perforated in the rock, present on every side their dark mouths. On the most elevated part of this extraordinary eminence, is a beautiful plain, covered with fine turf; it is partly fenced in by the mouldering wall of the fortress, but otherwise open to the surrounding precipices. From this spot the adjacent mountains, valleys, hills, woods, and villages, may be discerned. "While," observes the traveller, by whom these details are supplied, "with dismay and caution we crept on our hands and knees to look over the brink of these fearful heights, a half-clad Tartar, wild as the winds of the north, mounted without a saddle, and without any other bridle except the twisted stem of a wild vine, on a colt equally unsubdued, galloped to the very edge of the precipice, where, as his hurse stood prancing on the borders of eternity, he amused himself with pointing out to us the different places in the vast district which the eve commanded. We entered one of the excavated chambers,—a small square apartment, which led to another on our right-hand; and, on our left, a narrow passage conducted us to an open balcony, with a parapet in front, formed of the rock, on the very face of one of the principal precipices, whence the depth below might be contemplated with less danger. The vultures which hovered over the valleys did not appear larger than swallows; and the tops of the hills, covered by tufted woods, with the villages scattered smid the rocks and defiles, appeared at so intimidating a depth, that the blood shidled at the view.

fragely, butter continued to the mortemeters posed of the recovery, that house the shape of the assessed on which the metres at Mark my was built, and descending a few come from, wently bear out in the early we entered by a square done the severy collect by the Towns 1 112 CAPE to mis Writing. It has been eliterated, the the rest, out of the solid atoms ; has to open on tour sides. From the acceptant many part been verminament of all the successfier centity's o producted wavel as a most of million of mercentary of most sure. of windows, or large with cleans to the much a through there, it must equipment frame of a secrety near the distant presentant and calling clearly freque a whitime specially Then is making to my part of farregorecording the exampleon generalizer of the place. I the present he carried a meeter chamber builty to the errors cide in to different sides; there have all times out of the mater such. "

The party, in dominating, present a different more. which if they had intend quality execut, would our treardto always, here aftended those a view of the withina mary insufacion. They now per I because an abl reduct pass way of the estable, once he principal autonom They recent thanks the considered state of the mountains and the full into the valley is no fastit and prestanted, that a stuple fular step much prodiction tottle horse and raise, the afficiating, the danger to available and the server of the descript automorphism has the surfaced expensely that and area terbeld. It was that hadron they continue the leasures , and slay but came officially to regula the grandpol copie who to leady Hermania also dettle, entered garangeally to the tions where prosper a near all the farms in the westings in I notes will enter, and one stone tently electrical other processor tal programs on history or b. their story sover so distributed themper to my charges Wills that death all be made without stonger to continue comment of the year, inter-me are seend theresentro detarting themselves from the rapto shows, and served oil ladge them in eletroles on Threadlet the more, thaten for it is not the mittless of principles on their or more the store of the billion. earlier the positioner orbitis as moved to sto of above way, that are smally content smarly trust- or as

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THE NORTH CAPE.

[See Plate, No. 36.]

'This Cape forms the most northerly point of the Continent of Europe, and may be regarded as one of the sublimest wonders of nature. It is situated within the arctic circle, in seventy-one degrees ten minutes north latitude. It has been accurately described by a late voyager, from whose account the following particulars are extracted.

In approaching the Cape, a little before midnight, its rocks at first appeared to be nearly of an equal height, until they terminated in a perpendicular peak; but, on a nearer view, those within were found to be much higher than those of the extreme peak, or point. Their general appearance was highly picturesque. The sea, breaking against this immovable rampart, which had withstood its fury from the remotest ages, bellowed, and formed a thick border of white froth. This spectacle, equally beautiful and terrific, was illumined by the MIDNIGHT SUN; and the shade which covered the western side of the masks rendered their aspect still more tremendous. The height of these rocks could not be ascertained; but here every thing was on so grand a scale, that a point of comparison could not be afforded by any ordinary known objects.

On landing, the party discovered a grotto, formed of rocks, the surface of which had been washed smooth by the waves, and having within a spring of fresh water. The only accessible spot in the vicinity was a hill, some hundred paces in circumference, surrounded by enormous crags.— From the summit of this hill, turning towards the sea, they perceived to the right a prodigious mountain, attached to the Cape, and rearing its sterile mass to the skies. To the left, a neck of land, covered with less elevated rocks, against which the surges dashed with violence, closed the bay, and admitted but a limited view of the ocean. see as far as possible into the interior, our navigators climbed almost to the summit of the mountain, where a most singular landscape presented itself to the view. A lake in the foreground had an elevation of at least ninety feet above the level of the sea; and on the top of an adjacent, but less lofty mountain, was another lake. The

view was terminated by prakust encha, compared by

particles of most,

As midnight the san still committee egental alayross shows the horizon, and consumed to accept higher and higher till moon, when having again descended, is present the marth, without dipplied below the linetoon, This phone success, which is no exponentionery in the inhabitance of the toreist and samperate access, as some to to the inhabituate of the territ some, really not be stored without a posture In Interest. Two months of continued day-lady, distant which much the can mover som, men to plan the results. in a man state of experiences, while the other on the timebiliners of these regions to chigadur. (limby the their the sun is jurgemently share the horizon, they clar at ten in the noneming, dine at five or six in the evening, and go to his But, during the winter somen, where, from the lacoming at the reader and the out of Japanes, the we in visit rese, they shop almost half of the research from femiles, and employ the other half in sitting user the her, all fruemes being at an end, and a aunatant darkness providing.

The course of this pheriomenous, in it allows the nearlies and nearlies regions of the earth, may be readily understand. The our always illumines had that earth at annear and alture an every older stange determs from the place above to be exerted. When he is vertical ever the enterior, or equivalent transland pades, be shown as for a condopole and thus harpens in apring and actuans. Had, or in deathers to the same intermediate has about the merital poles, and all the countries none that pade for reach to propose and all the countries none that pade for reach to propose and all the countries none that pade for reach to propose an equal foundary of the countries, the same those patts to the countries. The offers a country at each pole in our weather, the am that the living countries of the equal-

About these wiles from the Weath Cape No. Alow, the construences general Surveyion Laptonia. This betweek is a very time interpolated with the group of materials.

PRECEPICES OF SAN ANTONIA.

Two mountain of San Antonia, on the route from Guayaquil to Quito, is described by Ulion as presenting a series of the most fearful precipices. In crossing this mountain, the declivity was in some parts so great, that the mules could not have kept their footing, had not the paths been filled with holes, upwards of two feet in depth, in which the mules placed their fore and hinder feet, occasionally dragging their bellies, and the legs of the rider, along the ground. Without these holes which serve as steps, the precipice would not be practicable. Should the creature impren, however, to place his foot between two of these holes, or to finiter in the alightest degree, the rider would fall, and perish inevitably. To lessen the difficulties and dangers of these cruggy paths, the Indians who go before the travellers, dig small trenches aeross.

The descent from the heights was a task of imminent danger. Owing to the encessive steepness, the water had washed away a greater past of the holes; while, on the one side were steep eminences, and on the other, the most frightful abyeses. The mules were themselves sensible of the caution recasisite in descending; for, on reaching the top of an eminence, they stapped, and having placed their fore feet close together, as in a posture of stopping themselves, they also placed their hinder feet together but a little forwards, as if going to lie down. In this attitude, having, as it were, taken a survey of the road, they slid down with the swiftness of a meteor. All the rider had to do, was to keep himself fast in his saddle, without checking his beast; as the least motion would have been sufficient to destroy its equilibrium, and both would have inevitably perished. The address of the creatures was truly wonderful, for, in this rapid motion, when they seemed to have lost all government of themselves, they followed exactly the different windings of the road, as if they had previously reconnoitered, and settled in their minds the route they were to follow, and taken every precaution for their safety, amid so many irregularities. The safety of the rider depended entirely on their experience and address;

that, long so they had been accustomed to truvel them roads, they still felt a degree of horner on marings that the of a steep declisity. Without being checked by the rider, they ampoint and if he madvernantly endourner # in opin them on, they were homowalds mult they had placed the norders in a recurrenture. They want neigh to the intented by recome, for they and only growed the count alle infreely, fine troubled and amoral at the danger emetters which implied the persy with the most described superhensions. The Indiana went below, and, obvince themselves along the sides of the mountain, where the held by the room of trees, animated the heagts with above until they at our started down the declinity.

There were some parts where the declivities were muon the ends of the menipices; but the road was so quirous and hollow, and the soles meanly perpendicular, that the imgur was almost e-just "Her wack being extremely arress. with or recally a sufficient width of the most to indust the made with to rider, if the former had fallen, the hand would never early have been emphys, and, for want of count to dismayage branch, would have been doublated in the limbs, if he had encaped with lifes. It was truly wounter ful to countder with what expresses these entireds, area Invine accreame the first emultion of their tens and glanthey were going to ollde down the declivity, securitied and their fire legs, or the end that they might pressure than equilibrium. The gentle inclination they made with the budy, at a proper distance, in following the served windtape of the mid, who also a mark it aurgeliling expensity; and, builty, thinks authors in exception therein too at the real on the langermore spreed, was and allegant the of alexand their Am agest protestioned and conflict could not been been

PHANTPINA UP THE TARRY WARMTOON, WHITE

THE Palm Mountain, entraped to Production District, to Small Caroline, present un aufid percipite ul dine fredo ther. The persons who know more that a plantium in. or the arrange faminally solves largeredly, and make a come to who will it migrate to suppose it the wayth of the observe

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Almost every one, on looking over, involuntarily falls to the ground, senseless, nerveless, and helpless; and would inevitably be precipitated, and dashed to atoms, were it not for measures of caution and security, that have always been deemed indispensable to a safe indulgence of the enriesity of the visitor or spectator. Every one, on procoeding to the spot, whence it is usual to gaze over the wonderful deep, has, in his imagination, a limit or bound. graduated by a reference to distances with which his eye has been familiar. But in a moment, eternity, as it were, is presented to his astonished senses; and he is instantly everwhelmed: his whole system is no longer subject to his volition or his reason, and he falls like a mass of lead, obedient only to the common laws of mere matter. He then revives, and in wild delirium, surveys a scene which, for a while, he is mable to define by description or limitation.

GEOLOGICAL CHANGES OF THE EARTH.

There are more things in heaven and earth
Than are dreamf of in our philosophy.
SHAKESPEARE.

THE variety of fossil substances, many of them marine productions, which are found in mountains remote from the sea, are undeniable proofs that the earth's surface has undergone considerable changes, some of which indicate an alteration of climate not easily to be explained. remains of animals inhabiting hot countries, and the marine productions of hot climates, which are frequently found in high northern latitudes, lead to a suspicion that the earth's axis was at a very remote period differently inclined to what it is at present. The tropics now extend twenty-three degrees and a half on each side the equator; but if they were extended to forty five degrees, then the arctic circle and the tropics would coincide, and thence would arise inconceivable variations in the productions and phenomena of the earth. All this would form an amusing speculation to a passon possessed of a terrestrial globe, who might tie a thread round it to represent the tropics at forty-five degrees of elevation.

By the goodest operation of the cos, and of tierra, the the of the plane has, he the course of ages, undergreeand participal changes. The topped her construction in particular pairs, and return trans where; and the mouthof large rivers, remany through law consules, have now have entiredly modified, by a deposition and transcer of the matter washed driven from the bond. At Haven, the con milwenting the econorciant; while it made in Time hark, where the about to that, In Holland the Laurity Loswas presents forced, in the audito some by constant assuptions of the are, where only the anall true Flores had betwee existed. The months of the Rhone have been rateunlocably sincered, so well in their dimensions so to their directions. The mud, as it is deposited by large covers grownally remove a defin, or a recognitive press of land, to green was take the ann. Then the mostly of the Attendance is eathly there was annual where filly miles were the short very of America. The educal called Samly House, of the entrance of the even of Sine Luck, is a about facts your were it prophered assurbed to the high land. The expe within the open of heavy years, line retiral mean than a mile from Reserve, to Egypt , and the minite of the Army, and of the Blance, wanted his is great immentational plane

The Javaness have a tradition, that in former than the belambe of amount, but a Path, and Brandman, place metent, and afternance expension bute none of Friend parts Play well, that when there the opened many remains shall have present away, they will be unless. In the Medius-De timble melt dinte, course mountaine of personal plant the total principal Halter, and chart of Ciones, to de promining more experiented in a read-channel, and the intermedian model falout of Chamber largest, top-sher with the latter, a weate takent. the the community we the own, and the tribull own of when parts of the land, the wholes of dutily, she also general inhabitante of which common on a manning who trust in the - 46 A- Manieram, timbe, and Hamans, are man little more than more proble, with small path to a directly tutore of around to the brillians - Arealine Sporting this Playstelland is howing them a protection that here there is affectly in the form consider that there are a vicent programming and observe and without they have not time every, anther them have at much

known to the Romans. The land, within which these tinmines were worked, must now be sunk, and buried beneath the sea. On the shifting of the sands between the islands. walls and ruins are frequently seen; the difference of level, since these walls, or fences were made, to prevent the encroachments of the sea, being estimated at sixteen feet. There is little doubt but that there must have been a subsidence of the land, followed by a sudden inundation. This, indeed, seems to be confirmed by tradition, there being a strong persuasion in the western parts of Cornwall, that there formerly existed a large country between the Land's-end and the islands of Scilly, now laid many fathoms under water. Although there are not any positive evidences of such an ancient connexion between the main land and these islands, still it is extremely probable, that the cause of the inundation which destroyed the greater part of them, may have reached the Cornish shores, there being several proofs of a subsidence of the land in Mount's Bay. The principal anchoring place, which was called a lake, is now a haven, or open harbour; and the mount, from its Cornish name, signifying the grey rock in a wood, must have formerly stood in a wood, but is now at full tide half a mile in the sea.

Examples of a similar kind, relative to every known country, might be multiplied. One of the most considerable inundations to be met with in history, is that which happened in the reign of Henry I. and which overflowed the estates of Earl Goodwin, forming the banks called the Goodwin Sands. In the year 1546, a similar irruption of the sea destroyed a hundred thousand persons in the territory of Dort, in the United Provinces; and a still greater number round Dollart. In Friezland and Zealand more than three hundred villages were overwhelmed; and their remains are still visible, on a clear day, at the bottom of the water. The Baltic Sea has, by slow degrees, covered a large part of Pomerania; and, among others, overwhelmed the famous port of Vineta. The Norwegian Sea has formed several little islands from the main land, and still daily advances on the continent. The German Sea. has advanced on the shores of Holland, near Catt, to such a degree, that the ruins of an ancient citadel of the Romans, formerly built on that coast, are now under water.

The concern our constant the falls of fills was, in the time of thete, about a flowered years our, not of the most definiting and legally unlitered apare in Carral Section . It who cream to have a and exceeding the several postures me the mater, until at leastly the ora, he a express almiliar to the one which but prompted to invasione, absorbinged the with his pirliam the latter limits the proposed the party pullies main, that of nine of the most testle sellers to the

On the other fame, the era fue to many conquere, to ersent the heart ; and by the department of the entirement to tions there and the nerventation of its ends in others. has also formed mor lands for this primer the table . Diney, were Runney Starate, was produced. In France, the town of Aluma Stepter, which was a common on the those of \$4. I away, to more augured none than four miles term the as. Policed, also in that kingston, are no which in the great of the and to more regressive at the miles within the family In Italy, a combingable parties of land the term ground of the about at the river Army and Ravenus, which mer small by the ma slife, to love the stainedly removed from the blowery part of Holland course in the a compact ferm the age, and in hate them is a said, in a mounce, have to home. The military is well, howorder, in the narrowing of dyking, to have to be brosedy note. are county for the water of the earth, in that contains, or and the exceptor part in him the surface of the east.

Three-fille of the sayforce of the place we complet by the one the greeners deputs of which has been estimated at from five to the miles. Deminumenter emode expe to Corest Borrow, and le surtime pure in the world, that great changes have taken place in the erholog mantion of the my -ne consumers with the read, which in more rapie, without the waves more the emments of not present day start mountains. The allers of this religion, and tention there. primite are entered and in the rounderstrop of the mode. mail pleasant in more " Bhananam a pomena," it will the proper in immount the phones and renty philosophissal vice in the accoming chillian the math has under Time contained in St. Hickord Philip's Maraline's Walk on Kine In our one near the banks of the Thomas, In Allters on both in two mounts places to laterater it . following observations and reflections on this highly curious and interesting subject. They apply the principles in a way to which they may be applied to any river, and indicate how much we are daily surrounded by the wonders of creation, the process of which, as Sir Richard observes, is never ceasing. In passing over the alluvial flat of Barnes Common, he introduces the following para-

graphs, p. 197.-

"On this Common, nature still appears to be in a primeval and unfinished state. The entire flat from the high ground to the Thames, is evidently a mere fresh-water formation, of comparatively modern date, created out of the rocky ruins which the rains, in a series of ages, have washed from the high grounds, and further augmented by the decay of local vegetation. The adjacent high lands, being elevated above the action of the fresh water, were no doubt marine formations, created by the flowing of the sea during the four thousand years when the earth was last in its perihelion during our summer months; which was between twelve and seven thousand years since. The flat, or fresh-water formation, on which I was walking, still only approaches its completion; and the desiccated soil has not yet fully defined the boundaries of the river. At springtides, particularly when the line of the moon's apsides coincides with the syzygies, or when the ascending node is in the vernal equinox, or after heavy rains, the river still overflows its banks, and indicates its originally extended scite under ordinary circumstances.

"The state of transition also appears in marshes, bogs, and ponds, which, but for the interference of man, would, many ages ago, have been filled up with decayed forests and the remains of undisturbed vegetation. Rivers thus become agents of the NEVER-CEASING CREATION, and a means of giving greater equality to the face of the land. The sea as it retired, either abruptly from some situations, or gradually from others, left dry land, consisting of downs and swelling hills, disposed in all the variety which would be consequential on a succession of floods and ebbs during several thousand years. These downs, acted upon by rain, were mechanically, or in solution, carried off by the water to the lowest levels, the elevations being thereby depressed, and the valleys proportionally raised. The low lands be-

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same of cooner the changels through which the races required to the ore, and the correspondences on these slides, bendened by the wind and only favor by five or we plantened precess repeated early training afforced and, so those which may present themselves in contrary with most rivers. The odl, thus are ordered and compounded, is wanted, but, bucker her man polestreed, and and endudue by solutions, it to me the threat medium but the worthin of all regenable principles, and hence the bunks of the rivers are the taxable restricted of men. Should the shemel canduring marrier (treff more and more, till it becomes cloudcal be be removed in at the carbet, them, for a time, labors would be formed, what, in tike meaner, would necess themselves and disappost. Non climately would then he torqued, or the rang would on differ most incredit antique, that the fall and the ovaporation would beliace one le other

" Such are the interming works at our grace, constrainty taking place on this experies surface of the courts; where, though less evident to the senses and experience of oran, multer apparently invest in me an prescrive a state of draws, from the operation of manualing and immedable convey as in the vaible generations of the ostered and vecomplia bipolome. The water, which and heat, the much of which savve cease to be exerted, we copsparity producing now combinations, changes, and cotune; which, if they arrard with the hormony of the whide, are lit and " good ;" but, if discordant are specher word, weignavan in, is per a and where-NYAR IS BUY DITY, IN BUT, OR STRUKT LIBARED TO BE "- BIRTS men to be the convenient properties of Astornation king and will have any about a what premiers have of cocation! All theper are the provinces effects of a halance of ignorable marris - the powers are resulted a painty post to a and, - while that reside is insemirable and precompositionally to constitues promised but a relative local, who the only to years and season, and also and not one morely he the sw

Again, in pare '5 to the Richard later dia rather into all a

"As I approached a sequestered mansion-house, and some other buildings, which together bear the name of Brick-STABLES, I crossed a corner of the meadew towards an angle formed by a rude inlet of the Thames, which was running smoothly towards the sea, at the pace of four miles an hour. The tide unites here with the ordinary current, and running a few miles above this place, exhibits twice a day the finely-reduced edge of that physical balance-wheel, or oscillating fluid-pendulum, which creates the earth's centrifugal power, and varies the centre of its forces. In viewing the beautiful process of Nature, presented by a majestic river, we cease to wonder that priestcraft has often succeeded in teaching nations to consider rivers of divine origin, and as proximate living emblems of Omnipotence. Ignorance, whose constant error is to look only to the last term of every series of causes, and which charges Impiety on all who venture to ascend one term higher, and Atheism on all who dare to explore several terms, (though every series implies a first term) would easily be persuaded by a crafty priesthood to consider a beneficent river as a tangible branch of the Godhead. But we now know that the waters which flow down a river. are but a portion of the rains and snows which, having fallen near its source, are returning to the ocean, there to rise again and re-perform the same circle of vapours, clouds, rains, and rivers. What a process of fertilization, and how still more luxuriant would have been this vicinity, if man had not levelled the trees, and carried away the crops of vegetation. What a place of shelter would thus have been afforded to tribes of amphibiæ, whose accumulated remains often surprise geologists, though necessarily consequent on the fall of crops of vegetation on each other, near undisturbed banks of rivers. Happily, in Britain, our coal-pits, or mineralized forests, have supplied the place of our living woods; or man, regardless of the fitness of all the parts to the perfection of every natural result, might here, as in other long-peopled countries, ignorantly have thwarted the course of Nature by cutting down the timber, which, acting on the electricity of the clouds, affects their destiny, and causes them to fall in fertilizing showers. Such has been the fate of all the countries famous in antiquity. Persia, Syria, Arabia, parts of Turkey, and the

The large count, have been residented and deserts by this toabsentions. The classic term the Western Ocean would being stone have present term the availability proves of bears of some or blacks of grants. It has easily make built but according to minimal continuations, while the Chance, the agent of an amount of minimal and of country while the wellth, which, he that some beautions a shallow breach, like the oner equally fitting Joshan, Craniaccording to the country of the coun

" I now descended entended a trial space near the city, which appeared to be in the same in which the area local averthouses and gradual entrangening in the elver had left it. It was one at those wester which the local at the manuer had not set realist come numerous calificator to laying and in large trade at which there therein atili salutate the agelow of the earth to the periaters state in which at we half by the accompany comes that have given it them. The Changes, doubtless, in a country age, covered the cotte rate; but It to the tondunce at cleans to improve themselves, by proporting profibe verentile constions on their consequently increasing and encounting limite, though the sames is greened fall produce every visity in currents, and, community, every sarinty of banks, as their devians conse. In the their, the convex of the river terripries almost ad where it that ouccomed a majord, and the detained maters then form lakes in the incersor. These lakes likendas gamerate entrouching banks, which findly fill up there busine, when new given me formed on higher lunch. Them in that men, became terrupted, and rereflection of the tyming circle of course produce one chair at those elevations of lovel aloves the lavel of the are, which have so much pursual realisting. The only con-Miles which a morary of dry land requires to increase and reser likely, to the alaman of salt water, consequent function the addresses to qualifying the at divide our

The Theore has not letterly been allowed in printing in natural effects, because for two those and vests the brinks are term inhabited by man, who mustle to appreciate the societal two by which the phenomena of the earth use purchased, has which if keys open the course of the river, and prevented the formation of interior lakes. The this

pian sea, and all similar inland seas and lakes, were, for the most part, formed from the choaking up of rivers. which once constituted their outlets. If the course of nature be not interrupted by the misdirected industry of man, the gradual desiccation of all such collections of water will, in due time, produce land of higher levels on their sites. In like manner, the great lakes of north America, if the St. Lawrence be not sedulously kept open, will in the course of ages, be filled up by the gradual encroachment of their banks, and the raising of their bottoms with strata of vegetable and animal remains. New rivers would then flow over these increased elevations, and the ultimate effect would be to raise that part of the Continent of North America several hundred feet above its present level. Even the very place on which I stand was, according to WEBSTER, once a vast basin, extending from the Nore to near Reading, but now filled up with vegetable and animal remains; and the illustrious CUVIER has discovered a similar basin round the site of Paris. These once were Caspians, created by the choaking and final disappearance of some mighty rivers—they have been filled up by gradual encroachments, and now the Thames and the Seine flow over them :- but these, if left to themselves, will, in their turn, generate new lakes or basins—and the successive recurrence of a similar series of causes will continue to produce similar effects, till interrupted by superior causes.

"This situation was so sequestered, and therefore so favourable to contemplation, that I could not avoid indulging What, then, are those superior causes, I exclaimed, which will interrupt this series of natural operations to which man is indebted for the enchanting visions of hill and dale, and for the elysium of beauty and plenty in which he finds himself? Alas! facts prove, however, that all things are transitory, and that change of condition is the constant and necessary result of that notion which is the chief instrument of eternal causation, but which, in causing all phenomena, wears out existing organizations while it is generating new ones. In the motions of the earth as a planet, doubtless are to be discovered the superior causes which convert seas into continents, and conneuts into seas. These sublime changes are occasioned by-

the progress of the prediction point of the variety while to etimene andhe in Sefn dom, and east press, erres um there and fine been freel our fitte source, and sine in class of the central Guera in the papellon as when the unitere to arrangements of the rely appearators to complete. The are and thomsen to an implied and this error, the error therehave productly receive and consider tong in lands decodepeleveren a bisener will they was to be the consider many opposition to mental enterediants of material materials are constitutioned in the first contraction of four Home I will have a flow wir comming by from our that her two again noville, a positive many ofthe armount of account off. Mary Human Sugar of these levels, that the proposition is true, eq. appears that the office of which I also spend feet been there are our from the properties and memore than industries how transported - been absoluted to such a communication." their manshors, therefore, room he the bank arrage enemy. Authorized they a winds the papie which years that! our aptenual bortomes and exectly manual and I there even the actionation of happen three of extensive bronderses. and of orms current ! - All - all will, in don there, by special away and district by the suspensing ocean, and the revenigled in the small immerials of human actions, nell me agests monthly the last Analamas, and remembered only in of whiterendered of our - Phillips Will to live

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The heat remains of animals are unit a exist are, intended and preserved in with make, promise to with the
safe measurements of the great changes which our planed
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powers operating from boundly, two little of the estands
and commonly with off the splittle and managing, from the
content object to their present characters above its outlines.

The calcareous, or homotone, mountains in Organisms.

and at Craven, in Yorkshire, having an elevation of about two thousand feet above the present level of the sea, contain, in a greater or less abundance, and throughout their whole extent, fossil remains of zoophites, shell-fish, and marine animals. Not any remains of vegetables have been found in the calcareous mountains of England; but, in the thick beds of shale and grit-stone lying upon them. are found various vegetable impressions, and above these regular beds of coal, with strata, containing shells of freshwater muscles. In the earthy limestone of the upper strata are sometimes found fossil flat-fish, with the impression of the scales and bones quite distinct. The mountains of the Pyrenees are covered in the highest part, at Mont Perdu, with calcareous rocks, containing impressions of marine animals; and, even where the impressions are not visible in the limestone, it yields a fetid cadaverous odour, when dissolved in acids, owing, in all probability, to the animal matters it centains. Mont Perdu, which rises ten thousand five hundred feet, nearly two miles above the level of the sea, is the highest situation in which any marine remains have been found in Europe. In the Andes they have been observed by Humboldt at the height of fourteen thousand feet, more than two miles and a half. Lastly, in southern countries, in and under beds of claycovering chalk, the bones of the elephant, and of the rhinoceros are frequently found.

These bones, as they have been brought from different parts of the world, have been examined with the utmost attention by the sagacious naturalist, Cuvier. He has observed characteristic variations of structure, which prove that they belong to animals not now existing on our globe: nor have many of the various zoophites and shell-fish, found in calcareous rocks, been discovered in our present seas. From these very curious facts he makes the follow-

ing deductions.

"These bones are buried, almost every where, in nearly aimilar beds: they are often blended with some other animals resembling those of the present day. The beds are generally loose, either sandy or marly; and always neighbouring, more or less, to the surface. It is then probable that these bones have been enveloped by the last, or by one of the last, catastrophes of this globe. In a great

paraller of places they are assumptioned by the accounts land mounter of about animals, but in stone places which are less minurents, there are minured them everyther. sometime the and in tweeter, which covered them, a minimo only continuous dietle Proposti authorite deal arrange proves that they have been ensered by results bude of inner, tilled with markette ; and, musepently, that the see has considered on these materialistical, for a long purcod-The entertraphy while invested thous was, therefore, a wond, but transport, mandatum of the ma, liquidatore there mee with, not ever in the high suffice values in some of the nature pures of Amagica. These house are notther called one patiend to a shelvron, but wasweed, and in most fractional. They have not, then, loves beaught trum use by investation, but found by it in plance. show h lan covered them, no might be come ted, if the minute to what they takinged had two it in these places. and had there are conservely died. Defers the cara dropler. have probable the d. showapper, in the dimere he which up and the up that hours the seas this connecation wheth principal them there's work as we are larger fired them, it - resistant that it has municipated those species. The morthern parts of the close, thursbire, nounteless becomely oner in turbungling to the grown of plant, hippopulance, chi. surrour, and figure, as well as to marticibile, given a of which the from treat have no bategor don the close againfree, a deepe in the toring your t and of the part more in ear hert."

That want part of the dry land was once cayment by the country approved the tribute all pediagram ever t and the discountry approved above, at the final country are not many part in at production, must retailed, but which have now danqueened from the court, lands to nonther had, not loss interesting, and which is no the same time considered with the object quantity, and which is no the same time considered with the object quantity of the product. These main recommendation is not been particularly at the product the times main, more about to be particularly, and irrespitable feat in any primary of actors a phenomena, and irrespitable feat in a cold operational respecting the past and future containing

of the terroughl ginne.

FOSSIL CROCODILES.

THESE fossils were collected in the neighbourhood of Honfleur, on the coast of France, and were found in a bed of hard limestone, of a bluish grey colour, which becomes nearly black when wet, and which is found along the shore on both sides of the mouth of the Scine, being in some places covered by the sea, and in others, above its level, even at high water.

Remains of crocodiles have also been found in other parts of France; as, at Angers and Mans. Some of these remains seem to show, that at least one of the fossil species above noticed is also found in other parts of France

besides Honfleur.

The remains of crocodiles have been also found in different parts of England; but particularly on the coast of Dorsetshire, and of Yorkshire, near Whitby; in the neighbourhood of Bath; and near Newark, in Nottinghamshire.

Somersetshire, particularly in the neighbourhood of Bath. the cliffs on the Dorsetshire, or Southern, coast, and on the Yorkshire, or Northern, coast, are the places in this island in which the remains of the animals of this triber have been chiefly found. The matrix in which they are found is in general similar to that which has been already mentioned as containing the fossils of Honfleur-a blue limestone, becoming almost black when wetted. This description exactly agrees with the limestone of Charmouth, Lime, &c. in Dorsetshire, on the opposite coast to that of France, on which Honfleur is situated. At Whithy and Scarborough, where these fossils are also found, the stone is indeed somewhat darker than in the former places; but no difference is observable which can be regarded as offering any forcible opposition to the probability of the original identity of this stratum, which is observed on the northern coast of France, on the opposite southern English coast, and at the opposite northern extremity of the island. Some of these remains are also found in quarries of common coarse grey and whitish limestone. Instances of this kind of matrix, for these remains, are observable in the quarries between Bath and Bristol,

The Rev. Mr. Handay, of Wandshester in Chaptering. ships, promoned, perture, were of the franchement open ment It was found by him in the weightenerbood of Built, would contains a great part of the level and of the south of the

LARIST STIRSTL ANSWAL DE MARGERMANT.

fine large summel, whose trail expectan are when in the amorries of Mainteight, has found theoryothy a frequent of neet of admirestions and the beautiful concurrance which the furnished pursues, in conserquence of their executions other of property office, in a morrey which admits of their fall offiplay, the accombined every spectmen of this front to behighly valued. The lines jaw of this entered, with some other specimens, which were presented by the Peter Compor in the Rayal Society, and whigh are own in the Rais the Statement, new among the most epitembel and anteresting

In 1770, the nockmen, linking discovered part of an omegapore local of an animal instanded in the solid atoms. in control the indiserrantions principes of the mountain, page helogramma to M. Hallomes, what, with the most englishassisticity, John and most last hard discovered this assaultcan toward shows the made to. Blue whom then was there the course of his belowns were regularly from little by an probability eater, related unused it as being properation of the hand aver the epart my relateds it was towned. Thenhams ob leveled byte. right in a result of matter ; but the industries of the Chapter to the time of this meatimathic fourth, but to the payment of homey have apreness. But in time, justice, As. I mean says, though tricky, in him welling this proper of the French Regarding around this treasure, which was conveyed in the

The tengin of the corvical, docut, and humber vertebras, appears to lave been about uine togs five inclies, and that of the vertebre of the toil about ten fort t tobling to a high the legith of the lead, which may be exchanged, country. in the less of the intermentaling barren, at least at franc in on may milly conclude the whole langth of the part

geological changes of the earth.

eton of the animal to have approached very nearly to

twenty-four feet.

The head is a sixth of the whole length of the animal; a proportion approaching very near to that of the crocodile, but differing much from that of the monitor, the head of which animal forms hardly a twelfth part of the whole length.

The tail must have been very strong, and its width, at its extremity, must have rendered it a most powerful oar, and have enabled the animal to have opposed the most agitated waters, as has been well remarked by M. Adrien Camper. From this circumstance, and from the other remains which accompany those of this animal, there can be no doubt of its having been an inhabitant of the ocean.

Taking all these circumstances into consideration, M. Cuvier concludes, and certainly on fair, if not indisputable, grounds, that this animal must have formed an intermediate genus between those animals of the lizard tribe, which have an extensive and forked tongue, which include the monitors and the common lizards, and those which have a short tongue, and the palate armed with teeth, which comprise the iguanas, marbres, and anolis. This genus, he thinks, could only have been allied to the crocodile by the general characters of the lizards.

FOSSIL REMAINS OF RUMINANTIA.

Among the fossils of the British Empire, none are more calculated to excite astonishment than the enormous stags' horns which have been dug up in different parts of Ireland. Their dimensions, Dr. Molyneux informs us, were as follows:—

	F	eet. Inch.
From the extreme tip of each horn,	-	10 10
From the tip of the right horn to its root, -		
From the tip of one of the inner branches to		
the tip of the opposite branch,	-	3 74
The length of one of the palms, within the		
branches,	-	2 5
The breadth of the same palm within the		
branches,	-	1 104
The length of the right brow antier,	-	1 2

A combine pair, formal roat frost insides ground, in the country of Clares, was presented to Clares. It and placed to the laces gathers. Laurence Cours, but you a decreased commissed must the ground state again palary.

At Hallywood, near Hally-diament, or Turvey, olphe unless from Dutching and at Pornmorey, near the reversionance, in the country of Captway; chailer haves have been found. In the countries shall of the Richard of Armoghi house, to Poliffer, was a foodband, with two manners of point of the brind of house, which, then the committee of the learner, must have much except and in size these of which the dimensions are given disease. Dr. Malvaesa states, that in the last twenty years, thurse out of themselves the twenty years, thurse out of these houses, that in the last twenty years, thurse out it there is no the country of the observations, along up by accident in this country of the observations, when, it several after persons from the post foregoines, while while there emission have been found in the land.

Various original hard form embetained imagesting this infinite and its anothing probabytes. Claim, however, does not appear to have from yet discovered and these remains many, therefore, he required as booking belonged to an antibal new trainer.

INISTIA GRUSAING UP AL PENANTS.

So name, although a year considerable names, of alephanis ever brought from Arren into that country, yet the easy extent through from Arren into that country, yet the easy extent through which those country have been bound, and the great probability that the Unition, particularly the Resistan, would have known sufficient of the balte of type, we have producted those from evaporation the tasks to the arrive best to the first, that by far the greatest manifes of those expenses what is have been she up, have been shounded as least, the mature of this particular to the entering of the particular that is the particular that is the particular that is the mature of this particular that is the particular that the particular thanks of the fact.

Le l'entre, n'esse it es well known that levine, aleptiones a beau much less (request, in less la times of which is less any record, that eptice in this is decree, in

fossil remains have been found in a great number of places, and in situations which prove their deposition at a very remote period. The whole valley through which the Rhine passes, yields fragments of this animal, and perhaps more numerously on the side of Germany than on that of France. Not only in its course, but in the alluvia of the several streams which empty themselves into it, are these fossil remains also found. Thus Holland abounds with them, and even the most elevated parts of the Batavian Republic are not exempt from them.

Germany and Switserland appear particularly to abound in these wonderful relics. The greater number found in these parts, is, perhaps, as is observed by M. Cuvier, not attributable to their greater abundance, but to the number of well-informed men, capable of making the necessary researches, and of reporting the interesting facts they dis-

cover.

As in the banks of the Rhine, so in those of the Danube, these fossils abound. In the valley of Alfmuhl is a grand deposit of these remains. The bones which have been found at Krembs, in Sweden; at Baden, near Vienna; in Moravia; in different parts of Hungary and of Transylvania; at the foot of the Hartz; in Hesse; at Hildesheim; all appear to be referable to this animal. So also are those which are found on the Elbe, the Oden, and the Vistula. Different parts of the British Empire are not less productive of these remains.

In London, Brentford, Harwich, Norwich, Gloucestershire, Staffordshire, Warwickshire, Salisbury, the Isle of Shepey, and, indeed, in several other parts of Great Britain, different remains of ... se animals have been found.

When we add to those places which have been already enumerated, Scandinavia, Ostrobothnia, Norway, Iceland, Russia, Siberia, Tunis, America, Huehuetoca, near Mexico, and Ibarra, in the province of Quito, near Peru; it will appear that there is hardly a part in the known world, whose subterranean productions are known to us, in which these animal remains have not been discovered.

.M. Cuvier is satisfied, from the actual comparison of several skulls of the East-Indian and African elephants, that different specific characters exist in them respectively. In the Indian elephant, the top of the skull is raised in a

sound of thinds personnel, both in the Address to so money to compute the form of the form of the control of the state of

I receive voice in millions in result in to decempline that the institute void sensitive despirates are more of the Aleis on a positive manufactor of the manufactor of the sensitive manufactor of the sensitive manufactor of the control town making over institute of the Lines limited operator, absenting on that, and relating antique, and relating to the Lines through their whole being the house through their whole being the house through their whole being the house their compact through their resulting and manufactor in tracers, have considered the transit responsible and the sense species with the Aston.

13. I aver, ancions to decover the degree of accommission in the feasil deplacet's shelver with that of the living person, compared the trend shall, mond or blocks by blocks for the trends of the Arrivan and Americ (to retaint). The result of the comparents was, that is the trends of persons the absorb of the trake me are in larger; the appropriate steff hand a different from: The posteriolist property of the trained hope is her very property and the trained to the set had been property as a few and the indirect of the set had trained as the result of the result of the set had been property. To these properties in the result shall, the trained thinks, and the sold-order the provided the provided to the provided to the provided the sold-order.

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It was, there were, be an expected as exercise, from the ulmost property of the form of th

to designate a difference of species, it may be then said, that there exist the fossil remains of, at least, two species of elephants, which were different from those with which

we are acquainted.

From the preceding observations it appears, then, that the fossil elephantina remains, notwithstanding their resemblance in some respects to the bones of the Asiatic elephant, have belonged to one or more species, different from those which are now known. This circumstance agrees with the facts of the fossil remains of the tapirs and rhinoceros, which appear to have differed materially from the living animals of the same genera. The remains of elephants obtained from Essex, Middlesex, Kent, and other parts of England, confirm the observation of Cuvier, that these remains are generally found in the looser and more superficial parts of the earth, and most frequently in the alluvia which fill the bottoms of the vallies, or which border the beds of rivers. They are generally found mingled with the other bones of quadrupeds of known genera, such as those of the risindeeros, ox, horse, &c. and frequently, also, with the remains of marine animals.

FOSSIL REMAINS OF THE MASTODON.

WE now come to the examination of one of the most stupendous animals known, either in a recent or a fossil state; and which, whether we contemplate its original mode of existence, or the period at which it lived, cannot

but fill our minds with astonishment.

The first traces of this animal are sketched in a letter from Dr. Mather, of Boston, to Dr. Woodward, in 1712, and are transcribed from a work in manuscript, entitled Biblia Americana. In this work, teeth and bones of prodigious size, supposed to be human, are said to have been found in Albany, in New England. About the year 1740, numerous similar bones were found in Kentucky, on the Ohio, and dispersed among the European virtuosi.

Many bones of this animal were found, in 1799, in the State of New York, in a large plain, bounded on every side by immense mountains, in the vicinity of Newburgh, situated on the Hudson, or North River. These remains are also found on the side of the three great chains of

mountains, the Alleringes, the North Mountains, and the Mise Mise Mise Mise Mise Mise Mise of Permaylenting and Carolina t and in new Jacoby, a ten miles from Philadelphia.

From a resolul offerationes in very chromotones, M. Curtes converters on large a right to compliate, there elits great uncotedon, or animal of the Him, this are surround the alegalization in historic, but was a tiste langue la grange . your tier limbs cutter thickory and its hilly employ. It cooper to leave very much resembled the rhiphaut in Ita enotes, and, indeed, in the whole of the considery; and is this appears to have had a reach. Him, more the assoling on countilizers by the eleginant, to an army particulars, the turns and areacture of the granders are milliotunity different a constant yourse. From the later discovered a correcting this ground, M. Cayler to also qualities to express a that its mod must have been similar to that of the hippoperanus and the laint, but pretiring the map and deally poors of expenditor in the servel of which species of ficulti would, of control, less land the small stuff and marchy appets on it up conten to have industrial. It then out, however, support to have been at all bornout the aminumacy, to be flying enough in the water, like the lappropotumes, but rather sures to was been entirely a torrestrat autoci-

PANEL SERVING AL LUS BILLINGORUS

There of India, a minute, with a superior of this with a minute, with a superior cont, and ordinate large, a paramete, by a upon of large the grandom. I That if the Carry of materia, the above critical angle, and having matery-style grandom, and on treatment. It find at building, a become, the extra large lightly minute, then be reached in that of the Capp, but forther instance tenths, like that if better

I to most termine at the ridinocere have been neverally hard in the entre construction being the remains of the planting in the local female for the local female and present to have at female, ally sociled attentions and presented for local their ways while to retend to a less units of the present the present the society of the units of the present the complete the property of the present the presen

by Grew merely as the tooth of a terrestrial animal; and the remains of this animal, found in the neighbourhood of Canterbury, were supposed to have belonged to the hippo-

potamus.

In Hartzberg, in the principality of Grubenhagen; Quedlimburg, Darmstadt, the borders of the Rhine, Mentz, Strasbourg, the neighbourhood of Cologne, Westphalia, numerous parts of France, and in several parts of Great Britain, the remains of the rhinoceros have been found. In Siberia these remains have been met with in considerable quantities. Pallas, whose researches have been particularly directed to this part of the world, made the astonishing discovery of a complete rhinoceros, still covered by its skin, and buried in the sand on the borders of the river Wiluji.

POSSIL REMAINS OF THE SIBERIAN MAMMOTH.

It has been demonstrated by Cuvier, that this animal was of a different species from the mastodon, or American mammoth. Its bones have been found in the alluvial soil near London, Northampton, Gloucester, Harwich, Norwich, in Salisbury plain, and in other places in England; they also occur in the north of Ireland; and in Sweden. Iceland, Russia, Poland, Germany, France, Holland, and Hungary, the bones and teeth have been met with in abundance. Its teeth have also been found in North and South America, and abundantly in Asiatic Russia. Pallas says, that from the Don to the Tchutskoiness, there is scarcely a river that does not afford the remains of the mammoth, and that they are frequently imbedded in alluvial soil, containing marine productions. The skeletons are seldom complete; but the following interesting narrative will show that, in one instance, the animal has been found in an entire state.

In the year 1799, a Tungusian fisherman observed a strange shapeless mass projecting from an ice-bank, near the mouth of a river in the north of Siberia, the nature of which he did not understand, and which was so high in the bank as to be beyond his reach. He next year observed the same object, which was then rather more disengaged from among the ice; but was still mable to con-

mitter what it was. Formula the unit of the fellowing annuage, 1961, he could distinctly one that it was the iroun correct of an energonic around, the entire flank of which, and one of he make, but become discipated from the fiel. In consequence of the tre beginning in melt one, they, and to a greater dispress than usual, in 1869, the fifth year of this discovery, the manual carries because united allowing and, and felt down trust the rescang on a rain bank formury just of the court of the Artic Down.—
In the mouth of March of that year, the Tunguisha capital many the two tasks, which he rold for life cubes, almost

filteen nountly decline.

Two years aftermands this unimal still remained on the workbank, where it had fallen from the ine; but its body was then greatly multiplied. The peasants had taken away mutarable quantities of its thesh to feed their dogs; and to wild monds, particularly the white bears, had also casted on the toronor, yes the eleleton remained units office, occasio that man of the fore less was gone. the entire, the milyte, one shoulder blade, and three leve. were still hold together by their ligaments, and by some remains of the ching and the other shoulder-blade was smed at a direct distance. The bend remained, covered by the strivet white, and the pupil of the eyes was ofth distingquishable. The limits also remained within the skull, has a ground about alarmed, and the level of the come was a few bases of in excellent preservation, will retaining a full of strong to lath hate. The population was a good deal cutou on avand the under his man entirely grow, on that the with ween morning room. The animal man a prair, and had a large wave on he nock,

The skin was argumenty thick and many; and as well at it considered as exquired the exercises of law more corresponds to exquire that with considerable difficulties from the thirty prouds weight at the half and histories of two manual were guilliered from the west conditions, having seen a remapled into the mond by the white bester, while histories the currence. The last was at there distinguished the currence of the last wester, is breaked in the first of the currence of the currence of the currence of the third side of the material and the third of contributions are also the third of contributions and the first in the currence of the currence of the third of the currence of the first of the currence of the first of the currence of the first of the currence of the curren

hair. These afford an undeniable proof that this animal had belonged to a race of elephants inhabiting a cold region, with which we are unacquainted, and by no means fitted to dwell in the torrid zone. It is also evident that this enormous animal must have been frozen up by the ice at the moment of its death.

FOSSIL SHELLS.

Ar whatever elevations these shells may have been found, and however remote from the parts of the globe now occupied by water, it is certain that they were once generated in the sea, by which they were deposited. The Altain chain of primitive mountains in Siberia is flanked on each side by a chain of hills inclosing marine shells. On a comparison of the forms, contexture, and composition, of these shells, as they have been found imbedded in rocks, not the slightest difference can be detected between several varieties of them and those which still inhabit the sea. At Toursine, in France, a hundred miles from the coast, and about nine feet beneath the surface, a bed of fossil shells has been found nine leagues in length, and about twenty feet in thickness. Such beds are known to exist in every part of Europe; and in South America, agreeably to Ulion, they are very frequent.

Great Britain abounds in these fossil productions. In the cliffs of the Isle of Sheppey, bordering on the Thames, several varieties of the crab, and lobsters nearly whole, have been found in a petrified state. Within the elevated lands in the vicinity of Reading, in Berkshire, an abundance of oyster-shells have been found, many of them entire, and having both their valves united. At Broughton, incolnshire, there are two quarries abounding in freshwater shells, which are found in a blue stone, supposed to have been formerly clay, and to have been gradually indurated. A bed of shells, twelve feet thick, and lying in a greenish sand, has been found about a mile from Reculver, in Kent. At Harwich, at the entrance of the river, a sandy cliff, fifty feet in height, contains shells, of which there are no less than twenty-eight varieties. On digging a moorish pasture, in Northamptonshire, many snails and river shells were found; and these were the more abun-

and in proportion as the workers proceeded to a great ingile. And, lastly, the petrilactions, known by the name of helegarity, have been tound in chall; puts, in different pass of the kingdom they are countly of limited, or consoll, and constitute contain a botton nucleus. They are suppressed to consilius a species of smallers, and were feeding or the superior to the success fitting of markles.

SMAFASAANAHAS PORRETA.

In the man 17170, a breach made by the Thomas, of the excompliancy high tale, immediated the marches of fluxers been and Havering in Lores. North was the temperouse. with all the were. That a large manage of commit was range me, three landred not me walth, and in some parts twenty has in depole. In this way, a presidential or it was, that had been buyens there warry more bullets, white proposed to some With ross exceptions, thus of a lorger out, having the greatest part of the brook, and ecour of the lightly and tunes in a president seaso, the or trong their is present to come tidate to the explore throne the any others the correspond on would They need black and hard, and their three over extreme by trought. West any elegant man autostolered of their learning provenienthe epolicy line they may buy and they went to manifer my given in many glavies they allowable steps to the processing. They were tenterished in a liber ware will, on the exercise of which they be questionly with a course sory set gee y answeld.

In presence where the Annual term rate by the water, want marriers of the simps in these subtures one trees, we make the interpretation of their result they grow, more the low on, some with their result training drawn, and information, being a hyperminan about in the critic to to do not written in terms. Plant above were the many, not as a laborate training the result from the same man a land of short, which has a recent the highway, in the downtract more without the many, heading to south the same and the downtract training the south the same and the downtract training to south the same training to the barrage of the collect runs a breach which is anything the south that the training to the barrage of the collect runs a breach which is anything to the many to the William Theorem Puniter. This breach is many to the many training to the Theorem Puniters and present

La Coogle

quently, if the bed of shells, as has been conjectured, was deposited in that place by an inundation of the Thames, it must have been such as to have drowned a vast proportion of the surrounding country, and have overtopped the trees near the river, in West Horrock, Dagenham, and the other marshes, overturning them in its progress. In support of this hypothesis, it should be remarked, that the bed of earth in which the trees grew, was entire and undisturbed, and consisted of a spongy, light, oozy soil, filled with the roots of reeds, of a specific gravity much less than that of the stratum above it.

The levels of Hatfield Chase were, in the reign of Charles I. the largest chase of red deer in England. They contained about one hundred and eighty thousand acres of land, about one half of which was yearly inundated; but being sold to one Vermulden, a Dutchman, he contrived, at a great labour and expense, to dischase, drain, and reduce these lands to arable and pasture grounds not subject to be overflowed. In every part of the soil, in the bottom of the river Ouse even, and in that of the adventitious soil of all marsh land, together with the skirts of the Lincolnshire Would, vast multitudes of the roots and trunks of trees of different sizes are found. The roots are fixed in the soil, in their natural position, as thick as they could have grown; and near to them lie the trunks. Many of these trees appear to have been burned, and others to have been chopped and squared; and this in such places, and at such depths, as could never have been opened, since the destruction of the forest, until the time of the drainage. That this was the work of the Romans, who were the destroyers of all the woods and forests which are now found underground in the bottoms of moors and bogs, is enced by the coins and utensils, belonging to that nation which have been collected, as well in these levels, as in other parts of Great Britain where these subterraneous forests have been discovered.

MOORS, MOSSES, AND BOGS.

In having been reported in Lincolnshire, that a large extent of islets of moor, situated along its coast, and visible only at the lowest ebbs of the tide, was chiefly composed of

the good trees, Dr. de Serre, seventimental by Sir Locale Charles, programmed, on the manufact September, 1746 to marriar theo mains and salvay. They landed on our of the largest of them balate, when the class were in the houses, and house its expensed author to the about amounts must be fresh and endency-live mentale. There were on shiped to encomming that the in hillers consider almost multiples of cours, country, brounders, and draves at trace and deputies, inecontract with leave of aquante plants. The remains of money of the trans were still examined on their sense; but the sensible of the greater paret in these by acastrooch in the rish supposed is controlled to feed in when they were green are . to that of the fire becomen the durity, many of which was found trap the flan alvery marginana at the cates they were describble. The thinker at all know, an the comments, was decomposed and earl, in the counce part of the trees like in some was firm, especially alumit the town. Found strong at confer had been alten traced by

in general, the trends, beauties, and rests of the decaped trace year complexably flattened,—a planetonium much has been along with a tile superchannel, actional areast of festivation and also beauties acted near the late of Third, in historical The cult was classed many self at entress leaves; and, in large theories have many of these area taken out in a parties a state.

These takes examined atoms twelve only in length, and one in the atth, apprehen the share of futton, as wheely been, on the say a well, a more of the same testine was award analy remain, at the dispute of extress feel, and, consignantly, very marky on the case level with that which was trained to below. The a history furify made, as the main telempter in the Earth Schang, is the period of the likelihory, to accretion the same of the appearance of the constant of the appearance of the above training the arms of the training at the constant of the training at the contract of the training in the above to the contract of the training at the contract of the training of the contract of the training of the contract of the training that the contract of the training the contract of the training the training that the training the training that the training the training the training that the training that the training that the training that the training the training that the training the training that the training tha

miles south of Sutton. On the north side, the moory islets extend as far as Grimsby, on the south of the mouth of the Humber: and it is a remarkable circumstance, that in the large tracts of low land which lie on the south banks of that river, a little above its mouth, there is a subterraneous stratum of decayed trees and shrubs, exactly resembling those observed at Sutton. At Axholme isle, a similar stratum extends over a tract of ten miles in length, by five in breadth. The roots there also stand in the places where they grew; while the trunks lie prostrate, amid the roots of aquatic plants and reeds.

Little doubt can be entertained of the moory islets of Sutton being a part of this extensive subterraneous stratum, which, by some inroad of the sea, has been there stripped of its covering of soil. The identity of the levels; that of the species of trees; the roots of these affixed, in both, to the soil where they grew; and, above all, the flattened shape of the trunks, branches, and roots, found in the islets, which can only be accounted for by the heavy pressure of a super-induced stratum, are sufficient reasons for this opinion. Such a wide-spread assemblage of vegetable ruins, lying almost in the same level, and that level generally under the common mark of low water, naturally gives rise to reflections on the epoch of this destruction,

and the agency by which it was effected.

The original catastrophe which buried this immense forest must have been of very ancient date; but it is to be suspected, that the inroad of the sea which uncovered the decayed trees of the islets of Sutton, is comparatively recent. The state of the leaves, and the timber, and also the tradition of the country people, concur to strengthen this suspicion. Leaves and other delicate parts of plants, though they may be long preserved in a subterraneous situation, cannot remain uninjured, when exposed to the action of the waves, and of the air. The inhabitants of Sutton believe that their parish church once stood on the spot where the islets now are, and was submerged by the inroads of the sea; that, at very low water, their ancestors could even discern its ruins; and that their present church was built to supply the place of that which was washed away. So many concomitant, though weak, testimonies. render their report to a certain degree deserving of credit. and bend as a supposition, that were of the drawny invalations at the Court less, which in these less contrartors windows away with large traces at least up to thereon, may have current away a will restling in clay, and have smaller manufaced the tree of show many talets.

they, and Moreon are hitle more thanks to filled up with se particle omitter, manufy of expendit ourgen. They are in he though one only to Infant and Southand, had about a some? moreliness coursely, prime apprintly when thinly progenity. It doubt be remarked, that fortund absorate to springs, which are namely der in commune : and then cram and woods grow alminimate about these quote. In the a incertices agricult world and one, without well lessening all the particular of them. Awa, that award or surings of the earth which weeth at the most of graye, being litted up, and made in any in appears for the motor in the minter, is arred in the spream, and sleen not fall together, but without in a fall-The year of the course through it is weak little ? during the following whaters and thus the oping is sail! name and more copped, and the cornel grows thicker and distance, all as break is maken what is called a quaking log. In proportion so it rises and becomes drive, and as the grows tools and albor regulables become more point. requestions with the mond and alone of the anter, it occasions a libertagene, and becomes what is called a curribus. Whop the varietables out, it is considered that the calme pure her are to more all carried every by the enter, in which there upo the intends but that the oils or orly homeone purity topermate and them on the major to a their the the feet acquies in inflammability. The laying manages of heland ore, so well so the plates, envered with hore, herence they always in springs, which, on ow and all a defective acquilition, or may desired they are then averyon with home.

In that remains a more a dear atmost a small the particular third which proves a Dones, a semestable on the constitute of the order of the ball between the transfer of the order of the ball opening on the which they becomes a strength order to globic to the spants. They was more amountained for the North of Levinet, be a disable of mirror ones, and to any particular that they have been described to a very sent to a state of the strength of the sent determined to a very sent to a state of the sent to

The production of the quaking bogs is as follows:--When a stream or spring runs through a flat, it becomes filled with weeds in summer, and trees fall across and dam it up. During the winter season the water stagnates more and more every year, until the whole flat is covened. coarse kind of grass, peculiar to these bogs, springs up in tufts, the roots of which are consolidated, and which, in a few years, grow to the height of several feet. In the winter the grass rots, and falls with its seed on the tufts, thus adding to their growth the ensuing spring. The tops of flags and grass are sometimes interwoven on the surface of the water, and gradually becoming thicker, cover its superfices. On this covering herbs grow; and by the interweaving of their roots, it is rendered so strong as to bear a man. Some of these bogs sink, where a man stands, to a considerable depth, and rise before and behind: underneath, the water is clear. Even these in time become red bogs; but may easily be converted into mendow land, by clearing a trench for the passage of the water.

Sir Hans Sloane, in his account of the bogs of Ireland, published in the Philosophical Transactions, notices a curious fact, namely, that when the turf-diggers, after having dug out the earth proper to make turf or peat, reached the bottom, so as to come to the clayey or other soil, by draining off the water, they met with the roots of fir-trees, with their stumps standing upright, and their branches spread out on every side horizontally. This was evidently the place of the growth of these trees, the branches of the roots of which are in some parts matted, as is seen in the roots of trees closely planted. Large pieces of wood have been found, not only in clay-pits, but likewise in quarries or stone-pits, in the blocks of stone raised out of their strata or layers. The black spongy mould employed for peat smells strongly of bitumen, or petroleum, a great proportion of the oil of which is yielded by distillation. In several parts of Ireland a singular phenomenon has been observed: on horses trampling with their feet on a space of soft ground, a sudden appearance of light ensued. On the mould, which agreed in colour, lightness, &c. with peat-earth, being examined with a microscope, the light was found to proceed from an abundance of small semitransparent whitish live worms which lay in it.

into the arrangement arrange of the bage of legland, and the persentables of draining them, cours and them as occurrethe thousands of acree indeed, want on the miles. Their sands and constituent pasts are the ethel by them as one and the commence of the posterior and the contract of A RECORD OF STREET THE PROPERTY OF THE STREET, AND SECURITION OF THE WOOD of vantifation to a maximum pool, which her furnished the demonts of the and increase of the plants environ its our toros. The progress of the communication many he best imperived by immediate a bacta, at conceave receivable of a errorite extent and dejab, formedlaf clay, finestone, gravet, or of this more character materials, through which the centre, countily but constantly angulard, enumer obtain an were. Undisturbed to this mater, a surface of box more grows, decays, and putrofice. To this second generation. sure its; and this is followed by others, until, at length, the limb rives considerably above the level of its limb, forming hillims o of various heights, simple, and dimensions -The ourses of a long to not level like a take, has metalic. tions and it terminates concentral absorptly, and above) perpendicularly. The average hought of the great look, store the level of high water mork in Phillip harlows, to about two builded and fifty free. Many server of those have love been reclammed; and the procettability of deathing and cultivating the greater proportion of them has been pointed out in the reports of the Commissioners.

Portlesiare, in Narth Heinin, absorbed in more, the actions of which are computed to extend and theread are theread are. The greatest height of the area, absenting our which it income to tracted best and a half. Its areas, when viewed at a distance, at one whilly contend with he are to the above chearly anatomic, to mend to be composed at another when the other chearly anatomic to the very of rame plants. Here also are heald immorrable graphs of trace, lying along when to their reads, the interest being still fixed in

the clay, as in their antorel nous.

The triupling of Singer May has greatly attended the public attendion; for, although the course of it is abvices, still the electron it produced on the attended of the outh, was more considerable; than any known in Gent action, as resulting from a natural course, since the descrip-

tion of Earl Goodwin's estate. It happened in the year 1771, after severe rains which had in many places preduced great inundations of the rivers. The following is a concise description of the spot where this event happened.

Along the side of the river Esk is a vale, about a mile in breadth, bounded on the south-east by the river, and on the north-west by a steep bank, about thirty feet in height above the level of the vale. From the top of the bank the ground rises on an easy ascent for about a quarter of a mile, where it is terminated by the moss, which extends about two miles north and south, and about a mile and a half east and west, being bounded on the north-west by the river Sark. It is probable that the solid ground, from the top of the bank above the vale, was continued in the same direction under the moss, before its irruption, for a considerable space; for the moss, at the place where the irruption happened, was inclined towards the sloping ground. From the edge of the moss there was a gully or hollow, called by the country people the gap, and said to be thirty yards deep where it entered the vale: down this hollow ran a small rill of water, which was often dry in summer, not having any other supply but what filtered from the moss.

The irruption happened, at the head of this gap, on the night of the 16th of November, between the hours of ten and eleven, when all the neighbouring rivers and brooks were prodigiously swollen by the rains. A large body of the moss was forced, partly by the great fall of rain, and partly by the springs beneath, into a small beck or burn. which runs within a few yards of its border to the southeast. By the united pressure of the water behind it, and of this beck, which was then very high, it was carried down a narrow glen between two banks about three hundred feet high, into a wide and spacious plain, over a part of which it spread with great rapidity. The moss continued for some time to send off considerable quantities of its substance, which, being borne along by the torrent, on the back of the first great body, kept it for many hours in perpetual motion, and drove it still farther on. During the first night, at least four hundred acres of fine arable land were covered with moss from three to twelve or fitteen feet in depth: Several houses were destroyed, munch care has, does but all the inhabitance compat. When the waters exhibited, the mass abstract in three j the report profits contained of each continued as an irrandition to the place where it have. Then then issued the leads, about the place where it have. Then then issued the leads, about the result and with a little addition, contained in increase remark, and with a little addition, contained in increase remark, and with a little addition, the link place of the resignational, made its may to the link, the neighborhood, made its may to the link, then great towards which desire an analysement of required to a great towards in a first ord more remarkable of Securition, and attitude in a first ord more add bullet on the lands of that overton. By this immode the about dight hundred agree of applied ground were constituted before the many approximation of the labilitation of anything and the labilitation of anyther excess territors desired.

Tradition in a preserved the morney of a circular mandation in another part at North Britain. As Transith p man changed its contract in one might, and accorded a great action of Transactions of a circular flow can Chareletows, in I amendia, which greatly algorithm in Charletows, in I amendia, which greatly algorithm in the build described and was regarded as integrity and more than an identification of the firm approximate length; and more above to such a month

LOBAL STOPS AND SPRANDS

tions of nature, which we named anythin or plantnaturals, on account of their diffing up the intermediate space lateres in the natural and regardle. Majordana, and in remains at them the outlines allowance of the distinctly considered. In the space their production in second costs and intends presented and intends production in second costs and intends presented and these productions of these ty which the contribé author has been monthfuely and less second a new acceptable page the arm.

The common foundation of the clusters of islands discovered by modern acceptance in the flucilis occase, so well as of those telegrapy to New Boath Wales, is wildowly of coral structure, response rosts of which shore only in all developments. There is every reason to helieve that the telegraphs which are requiremently raised by the technicalists.

agency of subterraneous volcanoes, do not bear any proportion to those which are perpetually forming, by the ailent but persevering efforts of the sea worms by which coral is produced. Banks of coral are found at all depths. and at all distances from the shore, entirely unconnected with the land, and detached from each other. By a quick progression, they grow up towards the surface; while the winds, heaping up the coral from deeper water, chiefly accelerate the formation of these banks into shoals and islands. They become gradually shallower; and when once the sea meets with resistance, the coral is quickly thrown up by the force of the waves breaking against the These coral banks have been seen in all their stages-some in deep water-others with a few rocks appearing above the surface, just formed into islands without the least appearance of vegetation; and, lastly, others covered with soil and weeds.

The loose corals, rolled inward by the billows in-large pieces, ground, and, the reflux being unable to carry them away, become a bar to the coagulated sand with which they are always intermixed. This sand, being easiest saised, is lodged at top; and when its accumulated mass is elevated by violent storms, and no longer within the reach of common waves, it becomes a resting-place to birds whom the search of prey draws thither. Their dung, feathers, &c. augment the soil, and prepare it for the reception of accidental roots, branches, and seeds, cast up by thewaves, or brought thither by birds. Thus islands are formed: the leaves and rotten branches, intermixing with the sand, produce in time a light black mould, in which trees and shrubs vegetate and thrive. Cocoa nuts, which continue long in the sea without losing their vegeta-tive powers, having been thrown on such islands, produce trees which are particularly adapted to all soils, whether sandy, rich, or rocky.

The violence of the waves, within the tropics, must generally be directed to two points, according to the monsoons. Hence the islands formed from coral banks must be long and narrow, and lie nearly in a meridional direction. Even supposing the banks to be round, as they seldom are when large, the sea meeting most resistance in the middle, must heave up the matter in greater quantities there, than

rewards the agreemittee; and, by the come sule, the contra will yountedly be aport, as at least lowest. They all also manuscriby lings maintings there, as the returnes of the mante, and meremulated, all be made ; auter Where the seeml forms are and repained to the connection tremment, there will alter then duration, and because i after comed, or ofe remarked in the partially, or of severaler terms, according to weathful of the metabore.

Captain Ultrainer, in his voyage to Terro Austrolle. gives a lively and iniversity alone statute of a caref seet on the mulbern ment of Nous Smuth Water. I'm this prost he lambed, and the vester heavy every close remail the refree. a non-creations, as it were, but landentive of the old, was presented in the slow. Wheat abcover, insulinguis, stuga' horns, enhance lessons, and a carbon of atter forms, were chaming mades water with vivid tinta of variety doubt besecret green, popula, brown, and white; equalling to be may, and executing in principles the most faringthe partiers at the cartion theres. These were different specwe or eval and timens, primary, as it were, our of the with such, and made had the middler favors and cloude of colorating; has, related contemplating the spring as of the we are, the demonstrate with which to was programmed could april for disputation.

Ittilerren conste la a dend rente, comocreul into a colle more of a duth-white colour, compound the stone of the and. The mean heads were timps which stood higher than the rest, and bring assembly day, were trackened by the weather t but even in time the terms of its diftreest corale and atom the lie were distinguishable. The values of this year, but positioningly on the emisside whose the any broke, were the finished parts; within these wome produced but a containing leve comb, againges, and as of and engineering and many entemples eachlies were more terrol upon different prices of the early At him-waters, these workles were more remained to be built upon; but (expective law, with much man and the water within tion shalls then sposes up to a strough, there are four finds mult it a from this muce and the equation of the water that they are illenovered, his, in other respects, they are correly to be decimposited from the cital ruch

Tilly description of a coret solund which he afternoon

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visited on the same coast, is truly philosophical and throws great light on these surprising productions of nature.

"This little island, or rather the surrounding reef, which is three or four miles long, affords shelter from the southeast winds. It is scarcely more than a mile in circumference, but appears to be increasing both in elevation and outent. At no very distant period of time, it was one of those banks produced by the washing up of sand and broken corn, of which most reefs afford instances, and those of Toures' Strait a great many. These banks are in different stages of progress; some, like this, are become islands, but not yet babitable; some are above high-water marks but destitute of vegetation; whilst others are over-

flowed with every returning tide.

"It seems to me, that, when the animalcules which form the corals at the bottom of the ocean, cease to live, their structures adhere to each other, by virtue either of the glutinous remains within, or of some property in salt water; and the interstices being gradually filled up with sand and broken pieces of coral washed by the sea, which also adhere, a mass of rock is at length formed. Future races of these animalcules erect their habitations upon the rising bank, and die in their turn, to increase, but principally to elevate, this monument of their wonderful labours. care taken to work perpendicularly in the early stages, would mark a surprising instinct in these diminutive creatures. Their-wall of coral for most part in situations where the winds are constant, being arrived at the surface, affords whelter, to leeward of which their infant colonies may be safely sent forth, and to this their instinctive foresight it seems to be owing, that the windward side of a reef exposed to the open sea, is generally, if not always, the highest part, and rises almost perpendicular, sometimes from the depth of 200, and perhaps many more fathours. To be constantly covered with water, seems necessary to the existence of the animalcules, for they do not work, except in holes upon the reef, beyond low-water mark; but the coral sand and other broken remnants thrown up by the sea adhere to the rock, and form a solid mass with it, as high as the common tides reach. That elevation surpassed, the future remnants, being rarely covered, lose their adhesive property; and remaining in a loose state,

corn what is usually called a key upon the tope of the real, the new bank is not how; in heavy visited by see having sait plants take test upon it, and a sait to jum to be noted at a core and break year if and deposit the series of oberho and trees, avery hyperide, and still mare every got, while something to the bank, the form of as island to gradually comment and fact of all courses man to take presenting.

"This island is well advanced to five above properties and it has been many years, productly commence, hince the reach of the highest agong time, or the week of the set in the heavest gales. I discinguished, however, in the cock o bick report to bount, the south cold, and shells accountly thrown up, in a more or less perfect state of columns, and pieces of qualify public stope, and other vacuum animals, which chance but mixed with the color-versus animals to make characteristic trape, were nothing to the rank stand, in none cases, were cell squareful from it the rank stand, to none cases, were cell squareful from it within the form. The upper part of the infant to account the same advances to be seen attack, with a little resource the same and account to both a time account of the same and allowers, which have fined to prompted by a large and a little resource and allowers and allowers and a little account on the same and allowers with the consecution of the part and the same and allowers to be its allowers and a little resource and allowers of the same and account of the same and allowers and a little resource and allowers of the same account of the same and allowers.

WIDE, AND INDOSTITABLE DESERTS.

ARIASTI VA KATO.

for had Acaste accessor in to Porch and Araldo, do to not of which country a continue there of consideration to the soft control of the first of these control of a on the control of Taylor or latitude the total of the provided by the river Alexan, and returned unto more of the Araba, and returned unto more marked the training to the Taylor, in a law, from each to twent, of about time from languaged English indice, and from marked anoth, of almost two languaged and faily. In the latter direction is price the provided and faily. In the latter direction is price the provided and faily. In the latter direction is price the great descript and faily. In the latter direction is price the price descript and faily one carminal descript and stretch in the way and results and price a space of about covers a track miles and aniles, this independent this wide covers into the

nearly equal portions. This vast extent is impregnated with nitre and other salts, which taint the neighbouring lakes and rivers, and has, on that account, been denominated the GREAT SALINE DESERT.

ARABIAN DESERTS.

THE SANDY DESERTS OF ARABIA form one of the most striking objects of that country. From the hills of Omon, which appear to be a continuation of those on the other side of the Persian gulf, as far as Mecca, the greater part of Negad is one prodigious desert, interrupted, towards the frontiers of Hejaz and Yemen, or Arabia Felix, by Kirge, containing the district of Sursa, and several cases, or fertile spots. The north-west part of Negad presents almost a continued desert, and is considered as a prolongation of the one above mentioned.

The Beled el Haram, or Holy Land of Islam, of which Mecca is the capital, is comprehended between the Red Sea, and an irregular line which, commencing at Arabog, about sixty miles to the north of Djedda, forms a bend from the north-east to the south-east, in passing by Yelemlem, two days' journey to the north-east of Mecca. It thence continues to Karna, nearly seventy miles to the east of the same place, and twenty-four miles to the west of Taif, which is without the limit of the Holy Land; after which, turning to the south-west, it passes by Drataerk, and terminates at Meherma upon the coast, at the port named Almarsa Ibrahim, about ninety miles to the south-cast of Djedda.

It therefore appears that the Holy Land is about one hundred and seventy miles in length, from the north-west to the south-east, and eighty-four miles in breadth, from the north-east to the south-west—which space is comprehended in that part of Arabia, known by the name of Ed Hedden, or the Land of Pilgrimage, and includes the cities of Median and Taif. It has not any river; and the only water to be found, is that of some inconsideable springs, which are not numerous, and the brackish water obtained from the deep wells. Thus it is a mean desert. It is at Mecca and Medina alone that cisterns have been wrought to preserve the rain water; on which account, a garden is very rarely to be seen throughout this

vast territory. The plains are composed either of sand, or bad earth, entirely abandoned; and, as the inhabitants do not in any part of the country, sow any description of grain, they are supplied with flour, &c. from Upper Egypt, Yemen, and India.

AFRICAN DESERTS.

THE most striking feature of APRICA consists of the immense deserts which pervade its surface, and which are supposed to comprise the one half of its whole extent, The chief of these is, by way of eminence, called SAHARA or the Desert. It stretches from the shores of the Atlantic, with few interruptions, to the confines of Egypt, a space of more than forty-five degrees, or 2700 geographical miles, by a breadth of twelve degrees, or 720 geographical miles. It is one prodigious expanse of red sand, and sand-stone rock, of the granulations of which the red sand consists. It is, in truth, an empire of sand which seems to defy every exertion of human power or industry, although it is interspersed with various islands, and fertile and cultivated spots of different sizes, of which Fessan is the chief of those which have been hitherto explored.

Nearly in the centre of this sandy ocean, and nearly mid-way between the Mediterranean Sea and the coast of Guinea, rise the walls of Tombuctoo, the capital of the very interesting empire of Bembarra—a city which constitutes the great mart for the commerce of all the interior of Africa. To maintain this commerce is the laborious work of the akkabaars, or caravans, which cross this enormous desert from almost every part of the African coast. The mode in which it is traversed is highly curious.

The caravans consist of several hundred loaded camels, accompanied by the Arabs who let them out to the merchants for the transport of their goods. During their route, they are often exposed to the attacks of the roving Arabs of Sahara, who generally commit their depredations on the approach to the confines of the desert. In this tiresome journey, the caravans do not proceed to the place of their destination, in a direct line across the trackless desert, but turn occasionally eastward or westward, according to the situation of certain fertile, inhabited, and cultivated spots, called oases, interspersed in various parts

of the Sahara, like islands in the ocean. These serve as watering-places to the men, as well as to feed, refresh and replenish the hardy and patient camel. At each of these cultivated spots, the caravan sojourns about seven days, and then proceeds on its journey, until it reaches another spot of the same description. In the intermediate journies, the hot winds, denominated SHUME, or SIMOOM, are often so violent, as considerably, if not entirely, to exhale the water carried in skins by the camels for the use of the passengers and drivers. On these occasions it is affirmed by the Arabs, that five hundred dollars have been frequently given for a draught of water, and that ten or twenty dollars are commonly paid, when a partial exhalation has occurred. These sarching winds will be particularly described, in treating of atmospherical phenomena.

In 1805, a caravan proceeding from Tombuctoo to

In 1805, a caravan proceeding from Tombuctoo to Tafilet, was disappointed in not finding water at one of the usual watering-places, when, horrible to relate, the whole of the persons belonging to it, two thousand in number, besides one thousand eight hundred camels, perished of thirst! Accidents of this nature, account for the vast quantities of human and other bones which are found

heaped together in various parts of the desert.

The following is the general route of the caravans, in crossing the desert. Having lest the city of Fez, the capital of Morocco, they proceed at the rate of three miles and a half an hour, and travel seven hours each day. In the space of eighteen days they reach Akka, where they remain a month, as this is the place of rendezvous at which they are formed into one grand accumulated caravan. In proceeding from Akka to Tagassa, sixteen days are employed; and here again, the caravan sojourns fifteen days to refresh the camels. It then directs its course to the oasis and well of Taudeny, which is reached in seven days: and, after another stay of fifteen days, proceed to Arawan, a watering-place, situated at a like distance. After having soiourned there fifteen days, it sets out, and reaches Tombuctoo on the sixth day, after having performed a journey of fifty-four days of actual travelling, and seventylive of repose, making, altogether, from Fex to Tombuctoo, one hundred and twenty-nine days, or four lunar months and nine days.

Another caravan sees out from Wolfman and Rob Assistance of Cape Buyadan and Consistent it tenders as Taylors and 20 Careline, or West Taylors, where investigated in entitles with proceeds to Tombuctes. The time temporal by this crease is five or its mouth, at it proceeds a line of Observan is five or its mouth, at it proceeds a line of Observan is five or its mouth, at it proceeds a line of Observan is five or its mouth, at it proceeds a line of Observant is five or the above and the process and Walest Americal, its a place around Agadeen, where it or consistently stays.

The conservants which seems the descripting be compared to llower in never least removed under convey, the state, we convey at the desert removing of a certain number of Araba, belonging to the tribe through whose territory the convent passes. Thus, in cross of the territory of World Almostati, it is not imported. Consequence of the certainy of World Delelm, deliver their charge to the protection at the chirts of this country. Thus, again, conduct is an the continue of the existing of the Magnetic Araba, ander whose one is at length conclus. Tombuccook. Any consist on the convent during this formers, is extended to the whole tribe to which the convey becomes a state for such as an insult to the whole tribe to which the convey because of the tribe on which the convey here.

Hearter these grand cornering, others arose the desert on an configure to william a contrary, or grand . "The te, have 20, 21, 2 personal experiments—as they are founding planeters. If pear the autiforn comment the desert, by the mateshow tellow, convert Dilling and Conjur. In the year 1798, S proportion propositing of their throughput country, links with the principle of the Similaria treating, depolling with acres municipal charges, was plantered and dispersent, with great berrylder. Then despettet that are conducted in that affice new mangers . The robbe hoogs consulted, the horses. are purchased as the entrance of the tents, and seems with and, in the money when a margin to library to price -There were thence amounted on the finish, or they have the of the deat, you by communicate the intelligence, and the abole tribe means their horses, jublic with them o The wall margins of breach consider on whose with they mental design the state of the second statement of the second was en waie, or make pro-place, they true thouse on the

Dr. Coxeste

arrival of the caravan, which they plunder without mercy, leaving the unfortunate merchants entirely destitute.

The food, dress, and accommodations of the people who compose the caravans, are simple and natural. Being prohibited by their religion the use of wine and intoxicating liquors, and exhorted by its principles to temperance in all things, they are commonly satisfied with a few nourishing dates, and a draught of water, travelling for weeks successively without any other food. At other times, when they undertake a journey of a few weeks across the desert, a little barley meal, mixed with water, constitutes their only nourishment. In following up this abstemious mode of life, they never complain, but solace themselves with the hope of reaching their native country, singing oc-casionally during the joiling, whenever they approach a habitation, or when the camels are fatigued. Their songs are usually sung in trio; and those of the camel-drivers who have musical voices, join in the chorus. These songs have a surprising effect in renovating the camels; while the symphony and time maintained by the singers, surpass what any one would conceive who has not heard them.-The day's journey is terminated early in the afternoon, when the tents are pitched, prayers said, and the supper prepared by sun-set. The guests now arrange themselves in a circle, and, the sober meal being terminated, converse till they are overcome by sleep. At day-break next morning, they again proceed on their journey.

PILGRIMAGE ACROSS THE DESERTS.

The following very lively description of a pilgrimage across the desert is given by Ali Bey, in his travels in Morocco, Tripoli, &c. It is an animated picture which pourtrays in the strongest colours the perils and sufferings en-

countered in these enterprises.

"We continued marching on in great haste, for fear of being overtaken by the four hundred Arabs whom we wished to avoid. For this reason we never kept the common road, but passed through the middle of the desert, marching through stony places, over easy hills. This country is entirely without water; not a tree is to be seen in it, not a rock which can afford a shelter or shade. A transparent atmosphere, an intense sun, darting its beams upon our beads, a ground almost white, and commonly of a concure form, like a burning glove, which because, according that a three. Such the faithful pictors of this district, brough which we were possing.

The tree of the desired the state of the sta

"We had now neither outen nor drack einte the preceding doct to the large and other beats were equally destined; though ever since nine in the evening we had been republicly rapidly. Mustly after many we had tan a drap of water venezing, and the name, as well as the pair actor also were were out with laterics. The males, attribute, and to explain their barriers till they man. This terrible marries to oppose their barriers till they man. This terrible marries we had better

" At two without in the offerences a man despress down will, and as if dond, from great ditty, want three. I stone with these or from all my pounds to award later. The litely wer which was laft to one if the leathers hadens, was agreement must be und come drope of reater progred bile the energy mann's amough, but without any short. I now talk that my own amount was beginning to thinghe goes and benjaming very much I determined to marrie on his only it. leaving the page follow believe. From this monoral attereof my enteren began to drag to wrentedy, and there was one paradiability of giving them any management they were photostoped to these unburger destine, no verse one chargest welly all arrive tenants. Imposed mealing with theate learnings war last to that, and I found on my way has of my Lunks on the greatest, religious housing what was bur more of an male objet buil been energing than, the stages.

having forsaken them as well as the care of my effects and

of my instruments.

I looked upon this loss with the greatest indifference, as if they had not belonged to me, and pushed on. But my horse began now to tremble under me, and yet he was the strongest of the whole caravan. We proceeded in silent despair. When I endeavoured to encourage any of the party to increase his pace, he answered me by looking steadily at me, and by putting his fore finger to his mouth to indicate the great thirst by which he was affected. As I was reproaching our conducting officers for their inattention, which had occasioned this want of water, they excused themselves by alledging the mutiny of the oudains; and besides, added they, "Do we not suffer like the rest?" Our fate was the more shacking, as every one of us was sensible of the impossibility of supporting the fatigue to the place where we were to meet with water again. At last, at about four in the evening, I had my turn and fell down with thirst and fatigue.

Extended without consciousness on the ground, in the middle of the desert, left only with four or five men, one of whom had dropped at the same moment with myself, and all without any means of assisting me, because they knew not where to find water, and, if they had known it, had not strength to fetch it, I should have perished with them on the spot, if Providence, by a kind of miracle.

had not preserved us.

Half an hour had already elapsed since I had fallen senseless to the ground, (as I have since been told,) when, at some distance, a considerable caravan, of more than two thousand souls was seen advancing. It was under the direction of a marebout or saint called Sidi Alarbi, who was sent by the Sultan to Ttemsen or Tremeten. Seeing us in this distressed situation, he ordered some skins of water to be thrown over us. After I had received several of them over my face and hands, I recovered my senses, opened my eyes, and looked around me, without being able to discern any body. At last, however, I distinguished seven or eight sheriffs and fakeers, who gave me their assistance, and shewed me much kindsess. I endeadoured to speak to them, but an invincible knot in my

throat seemed to hinder me; I could only make myself understood by signs, and by pointing to my mouth with

my finger.

They continued pouring water over my face, arms, and hands, and at last I was able to swallow small mouthfulls. This enabled me to ask, 'Who are you?' When they heard me speak, they expressed their joy, and answered me, 'Fear nothing; far from being robbers, we are your friends,' and every one mentioned his name. I began by degrees to recollect their faces, but was not able to remember their names. They poured again over me a still greater quantity of water, gave me some to drink, filled some of my leather bags, and left me in haste, as every minute spent in this place was precious to them, and could not be repaired.

This attack of thirst is perceived all of a sudden by an extreme aridity of the skin; the eyes appear to be bloody, the tongue and mouth both inside and outside are covered with a crust of the thickness of a crown piece; this crust is of a dark yellow colour, of an insipid taste, and of a consistence like the soft wax from a beehive. A faintness or languor takes away the power to move; a kind of knot in the throat and diaphragm, attended with great pain, interrupts respiration. Some wandering tears escape from the eyes, and at last the sufferer drops down to the earth, and in a few moments loses all consciousness. These are the symptoms which I remarked in my unfortunate fellow travellers, and which I experienced myself.

I got with difficulty on my horse again, and we proceeded on our journey. My Beduins and my faithful Salem were gone on different directions to find out some water, and two hours afterwards they returned one after another, carrying along with them some good or bad water, as they had been able to find it; every one presented to me part of what he had brought; I was obliged to taste it, and I drank twenty times, but as soon as I swallowed it my mouth became as dry as before; at last I was not able

either to spit or to speak.

The greatest part of the soil of the desert consists of pure clay, except some small traces of a calcareous nature. The whole surface is covered with a bed of chalky calcareous stone of a whitish colour, smooth, round, and loose.

and of the size of the fist; they are almost all of the same dimension, and their surface is carious like pieces of old mortar; I look upon this to be a true volcanic production. This bed is extended with such perfect regularity, that the whole desert is covered with it; a circumstance which makes pacing over it very fatiguing to the traveller.

Not any animal is to be seen in this desert, neither quadrupeds, birds, reptiles, nor insects, nor any plant whatever; and the traveller who is obliged to pass through it, is surrounded by the silence of death. It was not till four in the evening that we began to distinguish some small plants burnt with the sun, and a tree of a thorny nature

without blossom or fruit."

SANDS OF THE DESERT.

Now o'er their head the whizzing whirlwinds breathe, And the live desert pants, and heaves beneath; Tinged by the crimson sun, vast columns rise Of eddying sands, and war amid the skies, In red arcades the billowy plain surround, And stalking turrets dance upon the ground.

DARWIN.

In the pathless desert, high mounds of sand, shifting with every change of wind, surround the travellers on every side, and conceal from his view all other objects. There the wind is of a surprising rapidity, and the sand so extremely fine, that it forms on the ground waves which resemble those of the sea. These waves rise up so fast, that in a very few hours a hill of from twenty to thirty feet high is transported from one place to another. The shifting of these hills, however, does not take place on a sudden, as is generally believed, and is not by any means capable of surprising and burying a caravan while on the march. The mode in which the transposition of the hills takes place is not difficult of explanation. The wind sweeping the sand from the surface continually, and that with an astonishing rapidity, the ground lowers every moment: but the quantity of sand in the air increasing as quickly by successive waves, cannot support itself there, but falls in heaps, and forms a new hill, leaving the place it before occupied level, and with the appearance of having been swept.

he a presence of quarters of remaind months of the chiquantity of wood which to always flying about in the chimis the travelles has to seek the right direction, to wood being test to the examines are in the united of the fills of and which hound the argue, and which shaft from rane spot to marker as off or, a see to leave any thing to be according to the aby and much, without one count by which the projector was by house. Even the steepess twentup to the annual of extrements or harm disciples as the annual the field to rate of

The appropriate, the and theer, and the contention mohave over he steed place and describe every or men and being, to that the, we almost consimility mayeline; so it in the duck. The round rives here a penal of the great imperimetry; his long much, perpendicularly ergored, reservers his bread from the present, and from the third post of the aners; to sym are well delimited by thick excelled, hierarly provided with hair, and which he become half about 5 the reaction from at his tree, brood and anchosed the, prewith his treating deep onto the wind; his tone bearingthe him to peer the term op no with apply half the gamber of steps of any other animal, and therefore with less tangue, There advantages give him a milit and room out, an a ground where all raber animate walk with short, alone, and measured sterns, and not inthorner members. There's the suggeal, industrial by matter for these printings, Alberta is to winner. through progress to also Creater, who to be where her server the cannel to the African as he has betterned the remoteer in the Landsonter.

Limits and Inches, given the following interesting account of them certain pleasures. He had a peacetre at the following interesting account of them certain pleasures. He had a peacetre a denoted at rate and, the particles of which maps as light, that when taken in the lamb they were acceptable, and light, that they were acceptable, the about two principality terminals and west, and varying in language from the first remaining and west, and varying in language from the iteraty look. The pre-tars part of these terms preparate which the features are able to the pre-tars made by the pre-tars and account in the pre-tars and account in the pre-tars and account in the pre-tars and the transmitted presents and the features are accounted as a position of the particle and the transmitted presents and the features and the transmitted at the particle of the features and the transmitted at the particle of the features and the transmitted at the particle of the features and the particle o

wave, again ascending in a strait line, in the same extraordinary manner as above described, so as to form a hollow or path between them. Our traveller kept as much in these paths as the direction he had to take would allow: but it was not without great difficulty and fatigue that the camels were urged over the waves, when it was requisite to do so, and more particularly when they had to clamber up the lee-ward or perpendicular face of them, in attempting which they were often defeated. On the oblique, or shelving side they ascended pretty well, their broad feet saving them from sinking deeper than did the travellers themselves; and the instant they found the top of the wave giving way from their weight, they most expertly dropped on their knees, and in that posture gently slid down with the sand, which was luckily so unconnected, that the leading camel usually caused a sufficient breach for the others to follow on foot. The night was spent under shelter of one of these sand waves, the surrounding atmosphere being uncommonly hot and close.

On the following day, in crossing a desert of the same description, the like impediments occurred; but these were trifling compared with the distress suffered, not only by our traveller and his people, but also by the camels, from the floating particles of sand-a phenomenon for which he confesses himself at a loss to account. When he first observed it, in the morning, the desert appeared to have, at the distance of half a mile or less, an elevated and flat surface from six to twelve inches higher than the summits of the sand waves. This vapour appeared to recede as he advanced, and once or twice completely encircled his party. limiting the horizon to a very confined space, and conveying a most gloomy and unnatural sensation to the mind of the beholders, who were at the same moment imperceptibly covered with innumerable atoms of small sand, which getting into the eyes, mouth and nostrils, caused excessive irritation, attended by an extreme thirst, which was increased in no small degree by the intense heat of the son. This annoyance is supposed by the natives to originate in the solar beams caused the dust of the desert, as they emphatically ealer, to rise and float through the air—a notion which appears to be in a great measure correct, this sandy ocean being only visible thring the hottest part of the day.

The tatherman should theory of these may my same to make mitted by the without. When the gradual a lately make which on wall by the desert, corminers to quate of wand, they money request over some some my sof ourier, taying with treestable there, and hearing approprie to manufacture bredy of cared, where to describe as the morrow of the that was it as time diseaway, then e earning the varrantificate appropriate arrive to quantum. It it should be extent where managers the a such fession authorities estroy other, where it has no the arrange. planted this so to just apparently on the waster, the nearest in, that all the graces particles do settle, but that the main tulinger open became capital to such a degree by the best equational his the huming anisd on the red will, that they rement as a week in an insidecular and undulating again, until she committee transpossers names their specific gravity, when he can confer in will patiently they stab to the worth. This in among respective rationales with the appropriate of the nature Brahamay but, commonwhile to these combine to a arrident that the floating made qualit les apparent at all poriade at concentre only officers, which not burns the cone, is her ones necessary to find a primary count to; the placannuments. To remove may employment his hasing her a decurred in the teality of this thisting support of cand, be solds that he has even this phenomenon, and the Yannah. or watery illumin to trequent in theorie, called he the Provide anyone, in engineers quarters at the many manners, early of them helps to ble with particulty diction to White the transer had a cloudy and dist appears, the latter was lominute, and realifying he nontaken for water. To covere turner when he has here advanced, he made that he was strements prined by a tuber tenni historia; who informed issue ifact for land withmood they assuring marity, in proming through the desert from Scatter, to a much greater degree than has been thereined, and, what is waterly condition, his quite in his big freen formal to bli Jun 11, 16 contequence of abordeneity of the classical in which his was enveloped.

the tenseller was preserve to a current description of the public or command and framed in the descript. He expensioned a rubers immedia, so great of wind, which must me on so and body, that, it has been but have been directly the game, is such there were the purposed of its arrestable of the game, is such that have been directly in which have been as are at time.

rity to have endeavoured to six on the camels during its impetuous fury. Before it began, the sky was clear, save a few small clouds in the north-west quarter; and the only warnings it afforded, were the oppressive sultriness of the air, and a vest number of whirlwinds springing up on all sides. These whirlwinds, he observes, might perhaps be more correctly expressed by some other name; butas the wind issued from them he adopts the term. They are vast columns of sand, which begin by a trifling agitation, with a revolving motion on the surface of the desert, and gradually ascend and expand, until their tops are lost to the view. In this manner they move about with every breath of wind, and are observed, thirty or forty of them at the same time, of different dimensions, apparently from one to twenty yards in diameter. Those who have seen a water-spout at sea, may exactly conceive the same formed of sand on shore. The moment the guide saw the whirlwinds disperse, which they did as if by magic. and a cloud of dust approaching, he advised the party to dismount, which they had hardly time to do, and lodge themselves snugly behind the camels, when a storm burst upon them with a furious blast of whad, the rain falling in huge drops, and the air being so completely darkened. that they were unable to discern any object at the distance of even five yards.

The following is Bruce's account of this singular phenomenon, which he represents as one of the most magnificent spectacles imaginable, and by which himself and his companions were at once surprised and terrified. Having reached the vast expanse of desert which lies to the west and north-west of Chendi, they saw a number of prodigious pillars of sand at different distances, at times moving with great celerity, and at others stalking on with a majestic slowness. At intervals the party thought they should be overwhelmed by these sand pillars; and small quantities of sand did actually more than once reach them. Again, they would retreat so as to be almost out of sight, their summits reaching to the very clouds. There the tops often separated from the bodies; and these once disjointed, dispersed in the air, and did not appear more. They were sometimes broken near the middle, as if struck by a large cannon-About noon they began to advance with consisdetable swittness upon the party, the wind being very strong at north. Eleven of them ranged alongside, at about the distance of three miles from them; and at this interval the greatest diameter of the largest of them appeared to Mr. Bruce to be about ten feet. They retired with a wind at south-east, leaving an impression on our traveller's mind, to which he could give no name, though assuredly one of its ingredients was fear, blended with a considerable portion of wonder and surprise. It was in vain to think of fleeing: the swiftest horse, or fastest-sailing ship, would not have been of any use in rescuing him from his danger. The full persuasion of this riveted him as it were to the spot where he stood, and he allowed the camels to gain on him so much, that it was with difficulty he could overtake them.

On a subsequent occasion, an assemblage of these moving pillars of sand, more numerous, but less in size than the former, approached Mr. Bruce's party soon after sunrise, and appeared like a thick wood. They almost darkened the sun, the rays of which, shining through them for nearly an hour, gave them an appearance of pillars of fire. His people became desperate, some saying it was the day of judgment—and others, that the world was on fire.

Dr. Clarke, in his more recent travels in Egypt, thus

describes this phenomenon.

One of those immense columns of sand, mentioned by . Bruce, came rapidly towards us, turning upon its base as upon a pivot: it crossed the Nile so near us, that the whirlwind by which it was carried, placed our vessel upon its beam-ends, bearing its large sail quite into the water, and nearly upsetting the boat. As we were engaged in righting the vessel, the column disappeared. It is probable that those columns do not fall suddenly upon any particular spot, so as to be capable of overwhelming an army or a caravan; but that, as the sand, thus driven, is gradually accumulated, it becomes gradually dispersed, and the column, diminishing in its progress, at length disappears. A great quantity of sand is no doubt precipitated as the effect which gathers it becomes weaker; but, from witnessing such phenomena upon a smaller scale, it does not seem likely that the whole body of the sand is at once abandoned.

MINES, METALS, AND GEMS.

[See Plates, No. 38, 39, 40, 41.]

Through dark retreats pursue the winding ore, Search nature's depths, and view her boundless store ; The secret cause in tuneful numbers sing, How metals first were framed, and whence they spring: Whether the active sun, with chymic flames, Through porous earth transmits his genial beams: With heat impregnating the womb of night, The offspring shines with his paternal light: Or whether, urged by subterraneous flames. The earth ferments, and flows in liquid streams: Purged from their dross, the nobler parts refine, Receive new forms, and with fresh beauty shine :-*Or whether by creation first they sprung, When yet unpoised the world's great fabric hung: Metals the basis of the earth were made, The bars on which its fixed foundation's laid-All second causes they disdain to own, And from the Almighty's fiat sprung alone.

YALDEN.

Those excavations in which metals, minerals, and precious stones are dug, are called MINES, and receive, from the substances they yield, various denominations. The richest and most celebrated gold and silver mines are those of Mexico and Peru, in South America. Iron mines are more abundant in Europe than elsewhere. Copper mines are chiefly found in England, Sweden, and Denmark; and lead and tin mines in England: the latter, more particularly in the county of Cornwall. Quicksilver mines abound principally in Hungary, Spain, Friuli, in the Venitian territory, and Peru; diamond mines, in the East Indies, and in the Brazils; and salt mines in Poland.

To explain the structure of mines, it should be observed that the internal parts of the earth, as far as they have yet been investigated, do not consist of one uniform substance, but of various strata, or beds, of substances, extremely different in their appearances, specific gravities, and chemical qualities, from one another. Neither are these strata similar to each other, either in their nature or appearance, in different countries; insomuch that, even in the short extent of half a mile, the strata will be found quite differm what they are in another place. As little are

hay the course coins to respect or collectly. Innoversable varies and fiscours are bound to all of their ; but there are a centerly state cours to size and chape, that is to trape above to train vary inference time what may have been more with, whiteen to that which consider to be captiment. In these course the constitution is a companient.

In Consult, the most common opinion experienced by the rathers to, that crimic immension into the courter, and feed the core with which they are attenues a cash, carps . and that the minerals themselves will, to possess at now, or converted into the presidential at these arials to reach they have the newers efficienty, and will which they have the greatest interescepts. In his numeralizer of Comments. Mr. Prose thenks it must resemble to conclude, they must The were made and planted in vent, it, or very mon liter, the creation of the world; that then, a common with all other manage, they are subject to a degree of the territory, principling to, or consiling times, their ultimore degree at persection, wither quicker or slavers, no they are at groups or loss entit and clarable frame sent impositions. The manname in every metal a popular nongmetrone, and an approximention of professo of the many specific nature, by which no companied principles are dromat and ancient builties ; be particularly the contrary but to decomposition of the gates paring through the configurate conto at crous, and dependent to their project withour mereparts, muit has the accretion of moon as less of its homoversome porticles. the energible south may be demanded as that find at more

BIAGINAL WINES.

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they were induced to lay aside in consequence of their particular shape and great beauty, although they were igno-

rant of their intrinsic value.

The diamond works on the river Jigitonhonha are described by Mr. Mawe as the most important in the Brazilian territory. The river, in depth from three to nine feet. is intersected by a canal, beneath the head of which it is stopped by an embankment of several thousand bogs of sand, its deeper parts being laid dry by chain-pumps. The mud is now washed away, and the cascalhao, or earth which contains the diamonds, dug up, and removed to a convenient place for washing. The process is as follows. A shed, consisting of upright posts, which support a thatched roof, is erected in the form of a parallelogram, in length about ninety feet, and in width forty-five. Down the middle of its area a current of water is conveyed through a canal covered with strong planks, on which the earth is laid to the thickness of two or three feet. On the other side of the area is a flooring of planks, from twelve to fifteen feet in length, imbedded in clay, extending the whole length of the shed, and having a gentle slope from the canal. This flooring is divided into about twenty compartments, or troughs, each about three feet wide, by means of planks placed on their edges; and the upper end of these troughs communicate with the canal, being so formed that water is admitted into them between two planks about an inch separate from each other. Through this opening the current falls about six inches into the trough, and may be directed to any part of it, or stopped at pleasure, by means of a small quantity of clay. Along the lower ends of the troughs a small channel is dug, to carry off the water.

On the heap of earth, at equal distances, three high chairs are placed for the overseers, who are no sooner seated than the negroes enter the troughs, each provided with a rake of a peculiar form, and having a short handle, with which he rakes into the trough from fifty to eighty pounds weight of the earth. The water being then allowed to pass in by degrees, the earth is spread abroad, and continually raked up to the head of the trough, so as to be kept in constant motion. This operation is continued for a quarter of an hour, when the water begins to run clearer;

pull, the curring partial a haring hoto manufactory, the grand-like example to reduce up to the end of the transfer. At length the current flewing quier, large the larged of one are also what a time can not attended as the or increase can the what a time examined with grown each to discussion. When a suggest finds may, be manufactory example engaged, and a Sape like hands—in them actuals already made in the street from the fore large and the thant. An example them the events of from blue, and deposits it hands. An example them the courts of the hands and deposits in the example of the discussion, and both tilled collinguals from the courts of the discussion, and but the events of the discussion, and to the courts of the out the discussion is much as the out and shall events in the principal example.

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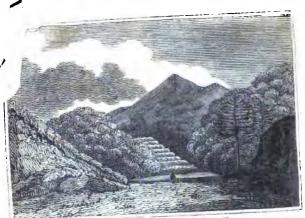
the rock. The earth being brought out, and carefully searched, affords stones of various shapes, and of a good water. This earth is of a yellowish, and sometimes of a reddish colour, frequently adhering to the diamond with so strong a crust that the separation becomes difficult.

To find the diamonds, the workmen form a cistern of a kind of clay, with a small vent on one side, a little above the bottom; in this vent they place a plug, and throwing into the cistern the earth they have dug, pour in water to dissolve it. They then break the clods, and stir the wet earth in the cistern, allowing the lighter part to be carried off in the form of mud, when the vent hole is opened to let out the water. They thus continue washing until what remains in the cistern is pretty clean; and then, in the middle of the day, when the sun shines bright, carefully look over all the sand, at which practice they are so expert, that the smallest stone cannot escape them. The brightness of the sun being reflected by the diamonds, aids them in their research, which would be foiled if a cloud were to intervene.

The specific gravity of the diamond is to that of water in the proportion of somewhat more than three and a half to one. It is the hardest of all precious stones, and can only be cut and ground by itself and its own substance. To bring it to the perfection by which its price is so greatly augmented, the lapidary begins by rubbing several of these stones against each other, while rough, having first glued them to the ends of two wooden blocks, thick enough to be held in the hand. The powder thus rubbed off the stones and received in a small-box for the purpose, serves

to grind and polish them.

The greatest known diamond was found in Brazil, and belongs to the King of Portugal. It weighs 1680 carats; and, although uncut, is estimated by Rome de l'Isle at the enormous sum of two hundred and twenty-four millions sterling, which gives an estimate of nearly eighty pounds sterling for each carat, the multiplicand of the square of its whole weight being taken. The one next in magnitude and value is that purchased in 1772 by the late Empress of Russia: it weighs seven hundred and seventy-nine carats, and has been estimated at nearly five millions sterling. It ought, however, to be observed, that these estimates, founded on the magnitude and brilliancy of the gems, are



No. 38.—Gold Washing in Brazil.



No. 39 .- Diamond Washing in Brazil.

new sinferent from the prices which the used princip inmes can inflict in pay or them. The dimensi in queminates about one humber can therefore the said quantited by a soft the one wides the extreme access, although
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BRUIN AND SECTOR STENDS

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Spaniards endeavour to justify by the plea that labourers could not otherwise be procured. The mita having thus, according to them, been rendered indispensable, they observe that it is conducted with all possible humanity; which those may believe who have never heard of the cruelties they have exercised, it may be said habitually, on the wretched Indians, since the conquest.

Lumps of pure gold and silver, called *papas*, from their resemblance to the potatoe, are often found in the sands. The poor likewise occupy themselves in *lavederos*, or in washing the sands of the rivers and rivulets, in order to find

particles of the precious metals.

To compensate for the mines which are rendered useless by the irruption of water, or other accidents, rich and new ones are daily discovered. They are all found in the chains of mountains, commonly in dry and barren spots, and sometimes in the sides of the quebredge, or astonishing precipitous breaks in the ridges. However certain this rule may be in the Viceroyalty of Buenos Ayres, it is contradicted in that of Lima, where, at three leagues distance from the Pacific Ocean, not far from Tagna, in the province of Africa, there was discovered not many years agar. the famous mine of Huantajaya, in a sandy plain at a distance from the mountains, of such exuberant wealth that the pure metal was cut out with a chisel. From this mine a large specimen of virgin silver is preserved in the royal cabinet of natural history at Madrid. It attracted a considerable population, although neither water nor the common conveniences for labour could be found on the spot, nor was there any pasturage for the cattle.

In the mint of Potosi about six millions of dollars are annually coined; and the mines of the viceroyalty of La Plata, taken collectively, are reckoned to yield about sixteen millions. The new viceroyalty of Buenos Ayres contains thirty gold mines, twenty-seven silver mines, and six-

teen of other metals.

The mines of Mexico, or New Spain, have been more celebrated for their riches than those of La Plata, notwithstanding which they are remarkable for the poverty of the mineral they contain. A quintal, or one thousand six hundred ounces of silver ore, affords, at a medium, not more than three or four ounces of pure silver, about one third of

when to weeked by the same quantity of interest to become Emission for reference and the section of the more than the most planetaner, and the technique of very many in their the minor of New Injects over an attach emission in classes of housings.

The first of the august mainter of the manufactured up working them, to not be continued to the community reinaminely delive than them of Person over none, alwested more 1720 in 1860, nearly hat y million at differ to said and alver, he very nearly five indiance of dallier agencilla. factor manuscher less than une freigh at the whole quantity of early and altere from Brose Spanies materibetes ting which there may productive as they were, that ratcourtes more than her through marketen of arms to verlogion. In Moxico, the labour of the mines to protectly fire, and better pull there are either bind of hadances, a miner mening from five to five dullars and a half merely, while the years of the common laborates do not record a willing and a faill. The fennigera, or persons who energy the over one these less has been the egest where it is they sust of the rouses, its than others at is collected in brough, receive a count sound to five Limited shallings for a day's week of six house. Neither stages, extentionly nor torged labourous, are employed in the Menious Miss

In consequence of the chicary important, and expensive much of charring them from water, neveral of the chicar or these mines have been needlewed and alambourty while the went of method in the arrangement of the galleries, and the absence of batcad communications, add to the involvability, and consily horizons the expense of working them. Labour is not, as in the reaching of the forestern mines, maideal, nor the framework of materials inclinated. When now works are understanding of the content to not becomes to not become a new the preliminary consequences and horizons to not becomes and the preliminary consequences and they are always constructed on the large and experiences a state.

More than three-barths of the after cheated from another is extracted from the me by the means of quick-alon, the boson of chart, in the process of analysismican, is a run and. The quantity consumes annually to New Spain along it observed street a lungual optimistic and district whale

America, class twenty-fire thousand quintule are or

nually expended, the cost of which, in the colonies, has been estimated at one-fourth of a million sterling. The greater part of this quicksilver has been lately furnished by the mine of Almaden in Spain, and that of Istria in Carniola, the celebrated quick-silver mine of Huancavelica in Peru having greatly fallen off in its produce, since the sixteenth century, when it was highly flourishing. The prosperity of the silver mines, both in Mexico and Peru, therefore greatly depends on the supplies of quicksilver from Spain, Germany, and Italy; for such is the abundance of the ore in those kingdoms, that the only limit to the quantity of silver obtained there, is the want of mer-

curv for amalgamation. In taking a general view of the riches of the other provinces of America, Mr. Humboldt, who has supplied these details, remarks that, in Peru, silver ore exists in as great abundance as in Mexico, the mines of Lauricocha being capable of yielding as great a produce as those of Guanaxuato; but that the art of mining, and the methods of separating the silver from its ore, are still more defective than in New Spain. Notwithstanding this imperfect system, the total amount of the precious metals annually furnished by America, is estimated at upwards of nine millions and a half sterling—the gold being in proportion to the silver as one to forty-six. From 1492 to 1803, the quantity of gold and silver extracted from the American mines has been equal in value to 5,706,700,000 dollars; of which immense sum, the portion brought into Europe, including the booty made by the conquerors of America, is estimated at 5,445,-000,000, giving an average of seventeen million and a half of dollars yearly. The annual importation being divided into six periods, appears to have been constantly augmenting, and in the following progressive ratio. From 1492 to 1500, it did not exceed 250,000 dollars. From 1500 to 1545, it amounted to three millions of dollars. From 1545 to 1600, to eleven millions. From 1600 to 1700 to sixteen millions. From 1700 to 1750, to twenty-two millions and a half. And, lastly, from 1750 to 1803, to the predigious sum of thirty-five millions three hundred thousand dollars, nearly equal to eight millions sterling.

The first period was that of exchange with the natives, or of mere rapine. The second was distinguished by the

conquest and plunder of Mexico, Peru, and New Granada, and by the opening of the first mines. The third began with the discovery of the rich mines of Potosi; and in the course of it the conquest of Chili was completed, and various mines opened in New Spain. At the commencement of the fourth period, the mines of Potosi began to be exhausted; but those of Lauricocha were discovered, and the produce of New Spain rose from two millions to five millions of dollars annually. The fifth period began with the discovery of gold in Brazil; and the sixth is distinguished by the prodigious increase of the mines of New Spain, while those of every other part of America, with the exception of the Brazils, have been constantly improving.

The GOLD MINES of BRAZIL are very productive. Those called GENERAL are distant about seventy-five leagues from Rio Janeiro, which is the staple and principal outlet of the riches of the Brazilian territory. They yield to the king, annually, for his right of fifths, at least one hundred and twelve arobas [weighing twenty-five pounds each] of gold. Their yearly produce may, therefore, be estimated at upwards of eight hundred thousand pounds sterling; and that of the more distant mines at about one third the

sum. The gold drawn from them cannot be carried to Rio Janeiro, without being first brought to the smelting houses established in each district, where the right of the crown is received. What belongs to private persons is remitted in bars, with their weight, number, and an impression of the royal arms. The gold is then assayed, and its standard imprinted on each bar. When these bars are carried to the mint, their value is paid to the possessor in coin, commonly in half-doubloons, each worth eight Spanish dollars. Upon each of these half-doubloons the kinggains a dollar. by the alloy and right of coinage. The mint of Rio Janeiro is one of the most beautiful in existence, and is furnished with every convenience for working with the greatest celerity. As the gold arrives from the mines at the same time that the fleets arrive from Portugal, it is necessary to accelerate the operations of the mint, and the coinage proceeds with surprising quickness.

In Africa, the kingdom of Mozamuc abounds in gold, 25*

which is washed down by the rivers, and forms a chief part of the commerce of the country. The kingdoms of MONOMOTAPA and SOFALA likewise furnish considerable quantities of gold; and the Portuguese who reside in the latter territory, report that it yields annually two millions of metigale, equal to somewhat more than a million sterling. The merchants export from Mecca, and other perts. about the same quantity of gold. The soldiers are paid in gold dust, in the state in which it is collected; and this is so pure, and of so fine a yellow, as not to be exceeded. when wrought, by any other gold beside that of Japan. Gold is likewise found on the island of Madagascar. The gold coast is so denominated from the abundance of gold found among the sands: it is not, however, so productive as has been generally supposed, owing to the intense heats, which, in a great measure, prevent the natives from procecuting their researches.

In Asia, the ISLAND OF JAPAN is most productive of gold, which is found in several of its provinces, and is, in by far the greater proportion, melted from its ore. is likewise procured by washing the sands, and a small quantity is likewise found in the ore of copper. The emperor claims a supreme jurisdiction, not only over the gold mines, but over all the mines of the empire, which are not allowed to be worked without a licence from him. Two thirds of their produce belong to him, and the other third is left to the governor of the province in which the mines are situated. But the richest gold ore, and that which yields the finest gold, is dug in one of the northern provinces of the island of Niphon, a dependency of Japan, where the gold mines have been highly productive until latterly, though they have much fallen off. In the Japanese province of Tackungo, a rich gold mine, having been tilled with water, was no longer worked: as it was however. so situated that, by cutting the rock, and making an opening beneath the mine, the water could be easily drawn off, this was attempted. At the moment of commencing the operation, so violent a storm of thunder and lightning arose, that the workmen were obliged to seek shelter elsewhere; and these superstitious people imagining that the tutelar god and protector of the spot, unwilling to ave the bowels of the earth thus rifled, had raised the were the counter them commiss of his given displace on all we is on emissions, distance in the displacement.

Torons, a mountainous country of Index coursing of great abundance of gold, which is resent to the reverse flowing from that territory into the Langes. In Humberson there are not any entere of gold; but in the humbe descript gold is collected to the recent which passes Netwoder in the Macrony Tabel, a Near leving the archiver privilege of this cultivation, for which he goes a small amount countries. Along to in general rays throughout the arcestal exitians, and there is in general rays influented at this mutal in India; but in Input there are everal effect miner, more particularly of the marking a presented, and the metal extracted from them in very past and line.

Turning to Luncers, Leature is said in michest times to have predicted an abundance of gold. Plly reportation in the common the conjugator Nero, fifty pounds of the previous metal sease daily taken from the mines of that previous. It is added that Vibras, who was term by Augustian to calculate the Dalmatians, obliged that hardy and quantities people to work in the mines, and to expense the gold come the ore.

Bosonica, in Scharcella, contains more mineral generation, and has the interest of gold and alone. The district in a fall his letter are found to marged the Scalemento, have derived from the word croke, which algebra alone in all the Schweiten destress. Their produce considerate and resident and the interest condition with party and the interest conditional with party quarter, in small, this forces, resembling more.

The kimpton of Serais as bornerly predicted grids, but the asperior of working the interest, and primitive, the passence, there were there there in profit, these liver here newteened. There are, brokeness, offset mines, which here extremely volumble, and give employments in acceptable throughout with a forest throughout of these to at Kondon with and personal in the white the term who mountainly tends, and propled with the other word with the manual of the tends of the

The silver ore is not, as was at first imagined, confined to the mountain between Konigsberg and the river Jordal. but extends its veins for several miles throughout the adjacent districts, in consequence of which new mines have been undertaken in several places, and prosperously car-· ried on. One of the richest and most ancient of the mines. named "Old God's blessing," has sometimes, in the space of a week, yielded several hundred pounds weight of rich The astonishing depth of this mine, which is not less than a hundred and eighty fathoms perpendicular, fills the mind of the beholder with amazement; and the circumference at the bottom forms a clear space of several hundreds of fathoms. Here the sight of thirty or forty piles. burning on all sides in this gloomy cavern, and continually fed to soften the stone in the prosecution of the labours, seems, according to the notions commonly entertained, an apt image of hell; and the swarms of miners, covered with soot, and bustling about in habits according to their several employments, may well pass for so many infernal spirits; more especially when, at a given signal when the mine is to be sprung in this or that direction, they exclaim aloud: "Berg-livet, berg-livet!" Take care

The gold mines of CREMNITZ lie forty miles south of the Carpathian hills; and twenty miles farther to the south, are the ailver mines of Shemnitz. These are called mining towns; and the former is the principal, its rich ores being found in what is styled metallic rock. Its mines also produce a certain proportion of silver. Hungary is beside enriched by a mineral peculiar to itself, or one, at least, which has not hitherto been discovered elsewhere, namely, the opal—a gem preferred to all others by the oriental nations. The opal mines are aituated at Ozerwiniza, where they are found in a hill consisting of decomposed porphyry, a few fathoms beneath the surface. Their produce is of various qualities, from the opake-white, or semi-opal, to the utmost refulgence of the lively colours by

which this noble gem is distinguished.

TRANSYLVANIA and THE BANNET contain numerous and valuable mines, consisting chiefly of grey gold ore, and white gold ore. The finest gold is found at Olapian, not far from Zalathna, intermixed with gravel and sand. The

sands of the Rhine, on the shores near Germerscheim and

Sels, also contain gold.

The mountains of SPAIN were, according to ancient writers, very rich in gold and silver; and accordingly Gibbon calls that kingdom "the Peru and Mexico of the old world." He adds that, "the discovery of the rich western continent by the Phenicians, and the oppression of the simple natives, who were compelled to labour in their own mines for the benefit of strangers, form an exact type of the more recent history of Spanish America." The Phenicians were simply acquainted with the sea-coasts of Spain: but avarice as well as ambition carried the arms of Rome and Carthage into the heart of the country, and almost every part of the soil was found pregnant with gold, silver and copper. A mine near Carthagena is said to have yielded daily twenty-five thousand drachms of silver, or three hundred thousand pounds sterling a year. The provinces of Asturia, Gallicia, and Lusitania, yielded twenty thousand pounds weight of gold annually: the modern Spaniards have, bowever, chosen rather to import the precious metals from America, than to seek them at home.

PORTUGAL is in many parts mountainous, and these mountains contain, beside others, rich ores of silver; but the Portuguese, like the Spaniards, being supplied with metals from their transatlantic possessions, and particularly with an abundance of gold and silver from Brazil, do not work the mines in their own country. Gems of all kinds, as turquoises and hyacinths, are also found in the above mountains, together with a beautifully variegated marble, and many curious fossils.

QUICKSILVER MINES.

The quicksilver mines of IDRIA are the most interesting of these, and demand a particular description, as they have been celebrated in natural history, poetry, and romance. The ban of Idria is a district immediately subject to the Chamber of Inner Austria, and lies westward of Carniola. The town, which is small, is seated in a deep valley, amid high mountains, on the river of the same name, and at the bottom of so steep a descent, that its approach is a task of great difficulty, and sometimes of danger.

The mines were discovered in 1497, before which time

that part of the country was inhabited by a few coopers only, and other artificers in wood, with which the territory abounds. One evening, a cooper having placed a new tub under a dropping spring, to try if it would held water, on returning next morning, found it so heavy that he could scarcely move it. He at first was led by his superstition to suspect that the tub was bewitched; but perceiving at length a shining fluid at the bottom, with the nature of which he was unacquainted, he collected it, and proceeded to an apothecary at Laubach, who, being an artful man, dismissed him with a small recompense, requesting that he

would not fail to bring him further supplies.

The subterraneous passages of the great mine are so extensive, that it would require several hours to pass through them. The greatest perpendicular depth, computing from the entrance of the shaft, is 840 feet; but as these passages advance horisontally, under a high mountain, the depth would be much greater if the measure were taken from the surface. One mode of descending the shaft is by a bucket; but as the entrance is parrow, the bucket is liable to strike against the sides, or to be stopped by some obstacle, so that it may be readily overset. A second mode of descending is safer, by the means of a great number of ladders, placed obliquely, in a kind of a sig-zag: as the ladders, however, are wet and narrow, a person must be very cautious how he steps to prevent his falling. In the course of the descent, there are several resting places, which are extremely welcome to the wearied traveller. In some of the subterraneous passages the heat is so intense, as to occasion a profuse sweat; and in several of the shafts the air was forw merly so confined, that several miners were suffocuted by an igneous vapour, or gaseous exhalation, called the fire-This has been prevented by sinking the main shaft deeper. Near to it is a large wheel, and an hydraulic machine, by which the mine is cleared of water.

To these pernicious and deadly caverns criminals are occasionally banished by the Austrian government; and it has sometimes happened that this punishment has been allotted to persons of considerable rank and family. An incident of this nature, in the person of Count Alberti, laid the foundation of Mr. Sargent's clegant dramatic

poem entitled & THE MINE. 27

The Count has any laught o start with an American segment rel, and out the Lagurage's removed and having left him an anal, were alithered meanab rolle to the our of the forces. of barns, where he was appropriately and atterwiseds onand he a hard of rolline, who had buy introval time il, his a close merculate at the place to whale they were superalist, and after a very aberimen consumer, by which his presider just of them meet billed, he probable and one and an Vincine, to be healers alive me the wheel. The mentalineen was, by the intercession of his name, there. and men that all proportions continuously and takens in the urbane of there—a west now which, he is notificiously, was course thoughouther. To those within his was accompanied by the forgumes, the lady, who believed to more in the first samle , as the want, and who, beging tried every nownin groupher has benchmand's paraloge without offers, recolous at length to their life mineries, as the could not collars. They were terrounted, honever, by his ponton tening presented by the general with selmen he had tought the closely on the latter lang recovered from his wounds ; and this mildenan, to be return to Vicuna, and again to here firth Devent, and restored to his fortune and rank.

TAUF MIRES.

Native than, the excepting of which was higherly prostronial, has been award in award plants a track being yer, the from honey commune, and moves disposed union. A mass of this description of non-war democrats in the there ent not Fantinger and Controlly to Should democking, his a pricty of Indiana, in the needs of a wide extended polytic. If prayer took where a first along the promine, awards the where of its upper earliers from vestile . and the more of to here they bear the party of the section of the section of a section of mountains, and every the greatest stope, while the section Leavent of a handred language was a march well no acids were previous. Although the paters was attended with stall Anager on arritant of the west of water, and distribute a a wifet leagues in these absents, we went and obtained a in the regge at grant, authorized to your the poor; and besting as accomplished their parises, and a open more of the said of The I are and Almerica, related to more franch in he take plan-

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As it was reported that this mass was the extremity of an immense vein of the metal, a metallurgist was sent to examine the spot, and by him it was found buried in pure clay and ashes. Externally it had the appearance of very compact iron, but was internally full of cavities, as if the whole had been formerly in a liquid state. This idea was confirmed by its having, on its surface, the impression of human feet and hands of a large size, as well as that of the feet of a description of large birds, very common in South America. Although these impressions seemed very perfect, it was concluded, either that they were lusus nature, or that impressions of this kind were previously on the ground, and that the liquid mass of iron, in falling on it, received them. It had the greatest resemblance to a mass of dough; which, having been stamped with impressions of hands and feet, and marked with a finger, had aferwards been converted into iron.

On digging round the mass, the under surface was found covered with a coat of scorize from four to six inches thick, undoubtedly occasioned by the moisture of the earth, the upper surface being clean. Not any appearance of generation was observed in the earth below or round it for a great distance. About two leagues to the eastward was a brackish mineral spring, and a very gentle ascent of from four to six feet in height, running from north to south; with this exception, the adjacent territory was a perfect level. About the spring, as well as near the mass, the earth was very light, loose, and greatly resembling ashes, even in colour. The grass in the vicinity, was very short, small, and extremely uppalatable to the cattle; but that at a distance was long, and extremely grateful to them.— From these concurrent circumstances it was concluded, that this mass of native iron, which was estimated to weigh about three hundred quintals, was produced by a volcanic explosion. It is stated as an undoubted fact, that in one of the forests of the above district of Santiago del Estero, there exists a mass of pure native iron, in the shape of a tree with its branches. At a little depth in the earth are found stones of quartz of a beautiful red colour, which the honey gatherers, the only persons who frequent this rude territory, employ as flints to light their fires. Several of these were selected on account of their peculiar beauty, they being





No. 41 .- Copper Mine



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being greater in proportion as the steel is hotter, and the water colder. Hence arises the superiority of this metal for making mechanics instruments or tools, by which all other metals, and even itself, are filed, drilled, and cut. The various degrees of hardness given to iron, depend on the quantity of ignition it possesses at the moment of being tempered, which is manifested by the succession of colour exhibited on the surface of the metal, in the progress of its receiving the increasing heat. These are, the yellowish white, yellow, gold-colour, purple, violet, and deep blue;—after the exhibition of which the complete ignition takes place. These colours proceed from a kind of scorification on the surface of the heated metal.

The largest iron works in England are carried on in COLEBROOK DALE, in Shropshire. This spot, which is situated between two towering and variegated hills, covered with wood, possesses peculiar advantages, the ore being obtained from the adjacent hills, the coals from the vale, and abundance of limestone from the quarries in the vicinity. The romantic scenery which nature here exhibits, and the works which are carrying on, seem to realize the ancient fable of the Cyclops. "The noise of the forges, mills, " &c." Mr. Young observes, "with all their vast machinery, the flames bursting from the furnaces, with the burning coal, and the smoke of the lime kilns, are altogether horribly sublime." To complete the pecufiarities of this spot, a bridge, entirely constructed of iron, is here thrown over the Severn. In one place it has parted. and a chasm is formed; but such is its firm basis, that the fissure has neither injured its strength nor utility.

The great superiority of Swedish iron over that of all other countries, for the manufacture of steel, is well known, and is ascribed to the great purity of the ore from which the iron is smelted. Hitherts the British steel makers have not been able to employ British iron in their processes, it having been found too brittle to bear cementation; but attempts are now making by some very spirited steel makers at Sheffield; and from the products already obtained, great hopes are entertained of ultimate success. One of the most remarkable of the Swedish mines, if the name can with propriety be applied to it, is Tabern, a mountain of a considerable size, composed entirely of pure iron ore, and

counting to of large usest of ment rever which is a country, have been dependent. This manustria has deem vectorist for second three constraints, untuillessenting which is shown a correlar threimshood.

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all the galleries, &c; and, where the prosecution of the works, in the same direction, might be dangerous, orders are issued for the miness to stop, and an iron crown is fixed on the spot, as a prohibition ever to proceed further. The workmen then explore in a different direction, while every subterraneous excavation is nicely watched.

The traveller passes into the great chasm by a range of wooden steps, which cross, in a variety of directions, the rough masses of fallen rocks, of gravel, and of the ancient machinery. Ere he reaches the entrance of the cavern, he has to descend thirty toises; and this being accomplished, proceeds horizontally to a considerable distance within. He now loses the pure air of day, and gradually breathes an oppressive vapour, which rolls towards him, in volumes from the mouths of a hundred caves leading into the main passage. He now feels as if he were inhaling the atmosphere of Tartarus. The Swedish iron mines which are described above, are mere purgatories when compared with this Satanic dwelling. The descent is performed entirely by steps laid in the winding rock; and, in following the subterraneous declivity, the traveller reaches the tremendous depths of these truly Stygian dominions.

The pestilential vapours which environ him with increasing clouds, and the style of the entrance, remind him of Virgil's description of the descent of Æneas to the infernal regions. Here are to be seen the same caverned portico. the rocky, rough descent, the steaming sulphur, and all the deadly stenches of Avernus. The wretched inmates of this gloomy cavern appear to him like so many spectres. as poetic fiction has described them: and he is induced by the length of the way, joined to the excessive heat and its suffocating quality, to fancy that he will be made to pay dearly for his curiosity. In one part the steam is so excessively hot as to scorch at the distance of twelve paces, at the same time that the sulphureous smell is intolerable. Near this spot a volcanic fire broke out some years ago, in consequence of which, strong walls were constructed, as barriers to its power, and several contiguous passages, which, had it spread, would have proved dangerous to the mine, closed up.

The visitor has now to traverse many long and winding galleries, as well as large vaulted caverns, where the work-

men are dispersed on all sides, employed in hewing vast masses of the rock, and preparing other parts for explosion. Others wheel the brazen ore towards the black abyss where the suspended buckets hang ready to draw it upward. From the effect of such violent exercise, combined with the heat, they are obliged to work almost naked. Their groupes, occupations, and primitive appearance, scantily lighted by the trembling rays of torches, form a curious and interesting scene.

The depth of the mine being at least twelve hundred feet, a full hour is required to reach to the bottom. The mass of copper lies in the form of an inverted cone. Five hundred men are employed daily: but females are not admitted, on account of the deleterious quality of the va-

pours.

This mine was anciently a state prison, in which criminals, slaves, and prisoners of war toiled out their wretched existence. Near the bottom is a rocky saloon furnished with benches. It is called the HALL OF THE SENATE, on account of its having been the resting place of several Swedish Kings, who came, attended by the senators, to examine the works, and here took refreshments. It was in this mine that the immortal Gustavus Vasa, disguised as a peasant, laboured for his bread, in the course of a long concealment, after having been robbed by the peasant who

served him as a guide. In the year 1751, a very rich copper mine was wrought in the county of Wicklow, IRELAND. From this mine ran a stream of blue-coloured water, of so deleterious a nature as to destroy all the fish in the river Arklow, into which it flowed. One of the workmen, having left an iron shovel in this stream, found it some days after encrusted with copper. This led one of the proprietors of the mine to institute a set of experiments, from which he concluded that the blue water contained an acid holding copper in solution; that iron had a stronger affinity for the acid than copper; and that the consequence of this affinity was the precipitation of the copper, and the solution of the iron, when pieces of that metal were thrown into the blue water. These ideas induced the miners to dig several pits for the reception of this water, and to put bars of iron into them. The result was, that they obtained an abundance of copper, much purer and more valuable than that which they procured from the ore itself by smelting.

On the island of Anglesea, near Dulas bay, on the north coast, is PARYS MOUNTAIN, which contains the most considerable quantity of copper ore perhaps ever The external aspect of the hill is extremely rude. and it is surrounded by enormous rocks of coarse white quartz. The ore is lodged in a basin, or hollow, and has on one side a small lake, over the waves of which, as over those of Averaus, fatal to the feathered tribe, birds are never known to pass. The effect of the mineral operations has been, that the whole of this tract has assumed a most savage appearance. Suffocating fumes of the burning heaps of copper arise in all parts, and extend their baneful influence for miles around. That the ore was worked in a very remote period, appears by vestiges of the ancient operations, which were carried on by trenching. and by heating the rocks intensely, when water was suddenly poured on them, so as to cause them to crack or scale. In the year 1768, after a long search, which was so little profitable that it was on the eve of being abandoned, a large body of copper ore was found; and this has ever since been worked to great advantage, still promising a vast supply. The water lodged in the bottom of the bed of ore, being strongly impregnated with the metal. is drawn up and distributed in pits, where the same process is employed as in the Wicklow mine. The copper thus procured differs little from native copper, and is very highly prized.

In the Parys mine eight tons of gunpowder are annually expended in blasting the rock. Nature has here been profuse in bestowing her mineral favours; for, above the copper ore, and not more than two feet beneath the soil, is a bed of yellowish greasy clay, from three to twelve feet in thickness, containing lead ore, from a ton of which metal upwards of fifty ounces of silver are generally obtained. These works have added greatly to the population of the country, state they find employment for about fifteen hundred persons, who, with their families, are supposed to amount to eight thousand souls, all of them deriving their subsistence from the mines.

The copper mines of Conwall are very numerous.

and several of them large and rich in ore. It is remarkable that in various parts of this country the earth has produced such an exuberance of this metal, as to afford it in large massy lumps of malleable copper, several pieces of which are shewn in very curious vegetable forms. The particular ore named mundic, found in the tin mines, was for many ages considered of no other use but to nourish that metal while in the mine. In the reign of Queen Elizabeth, a laudable curiosity tempted several private individuals to examine into its nature; but the design miscarried, and the mundic was thrown, as useless, into the old pits in which the rubbish was collected. about a century ago, this purpose was effected by degrees; and the copper extracted from the ore now produces, on an average, upwards of one hundred and fifty thousand pounds annually, equalling in goodness the best Swedish copper, while the ore itself yields a proportionate quantity of lapis calaminaris for the making of brass.

At Ecrow MILL, near the river Dove, in Derbyshire, a valuable copper mine was discovered some years ago, and has since been worked to great advantage. In its position, situation, and inclination, it differs from any mine yet discovered in Europe, Asia, Africa, or America; the wonderful mass of copper ore not running in regular veins or courses, but sinking perpendicularly down, widening and swelling out at the bottom in the form of a bell The works are four hundred and fifty feet beneath the river Dove, it being the deepest mine in Great Britain. On the opposite side of Ecton hill is a valuable lead mine, the veins of

which approach very nearly to the copper mine.

Copper is converted into brass by the agency of Calamine, an oxide of zinc. It occurs frequently in beds, and in some places exists in great abundance. The Mendip hills, in Somersetshire, were once celebrated for their mines of calamine, which are now in a great measure exhausted. It is dug out of the earth, and, being broken into small pieces, is exposed to the action of a current of water, which washes away the light earthy matter, and leaves the calamine. The whole is then thrown into deep wooden vessels filled with water, and agitated for a considerable time. The galena sinks to the bottom, the calamine is deposited in the centre, and the earthy matter lies on the surface.

The calamine, thus separated from its impurities, is ground

to powder, and becomes fit for use.

HUNGARY abounds in valuable ores and minerals, and is most celebrated for its vast copper works, at a town called Herrengrund, built on the summit of a mountain, and exclusively inhabited by miners. Here the process, noticed above, of apparently converting iron into copper, is pursued with great success, several hundred weight of iron being thus transmuted every year. The vitriol with which the blue water is strongly impregnated, cannot be strictly said to convert the iron into copper, but insinuates into it the copper particles with which it is saturated; and this seeming transmutation requires a fornight or three weeks only: but if the iron be suffered to lie too long in this vitriolic solution, it becomes at length reduced to powder.

In Japan, copper is the most common of all the metals, and is considered as the finest and most malleable any where to be found. Much of this copper is not only of the purest quality, but is blended with a considerable proportion of gold, which the Japanese separate and refine. The whole is brought to Saccin, one of the five principal cities of Japan; and it is there purified, and cast into small cylinders, about a span and a half in length, and a finger's breadth in thickness. Brass is there very scarce, and much dearer than copper, the calamine employed in making it being imported from Tonquin in flat cakes, and

sold at a very high price.

Cornwall has been in all ages, famous for its numerous mines of tin, which are in general very large, and rich in ore. The tin-works are of different kinds, dependent on the various forms in which the metal appears. In many places its ore so nearly resembles common stones, that it can only be distinguished from them by its superior weight. In other parts, the ore is a compound of tin and earth, concreted into a substance almost as hard as stone, of a blueish or greyish colour, and to which the mundic; impregnated with copper, frequently gives a yellowish cast. This ore is always found in a continued stratum, which the miners call load; and this, for the greater part, is found running through the solid substance of the hardest rocks, beginning in small veins near the surface, perhaps not above half an inch or an inch wide, and increasing, as

they proceed, into large dimensions, branching out into several ramifications, and bending downward in a direction which is, generally, nearly east and west. These loads, or veins, are sometimes white, very wide, and so thick, that large lumps of the ore are frequently drawn up of more than twenty pounds weight. The loads of tin-ore are not always contiguous, but sometimes break off so entirely, that they seem to terminate; but the sagacious miner knows by experience, that, by digging at a small distance on one side, he shall meet with a separated part of the load, apparently tallying with the other end, as nicely as if it had been broken off by some sudden shock of the rock.

The miners of Cornwall follow the load, or vein, in all its rich and meandering curves through the bowels of the flinty earth. The waters are sometimes drained from the mines, by subterraneous passages, formed from the body of the mountain to the level country. These passages are called adits, and are occasionally the labour of many years; but when effected, they save the constant expense of large water works and fire-engines. From the surface of the earth the workmen sink a passage to the mine, which they call a shaft, and place over it a large winch, or, in works of greater magnitude, a wheel and axle, by which means they draw up large quantities of ore at a time, in vessels called kibbuls. This ore is thrown into heaps, which great numbers of poor people are employed in breaking to pieces, and fitting the ore for the stamping mills.

A third form in which tin appears is that of crystals; for this metal will under proper circumstances, readily crystalize. Hence, in many parts of the mineral rocks, are found the most perfectly transparent and beautiful crystals of pure tin. Beside these crystals, in many of the cavernous parts of the rocks, are found those transparent crystals, called Cornish biamonds, they being extremely brilliant when well polished. The form is that of a six-sided prism pointed on the top, and they are sometimes four or five inches in length.

Among the most remarkable LEAD MINES, may be cited those of UPPER LOUISIANA, in NORTH AMERICA, which have for many years been highly productive. That called Burton's mine is so extensive, that the mineral is calculated

to cover two thousand acres of land. It is of two kinds, the gravel and fossil. The gravel mineral is found immediately under the soil, intermixed with gravel, in pieces of solid mineral weighing from one to fifty pounds. Beneath the gravel is a sand rock, which being broken, crumbles to a fine sand, and contains mineral nearly of the same quality as that of the gravel. But the mineral of the first quality is found in a bed of red clay, under the sand rock, in pieces of from ten to five hundred pounds weight, on the outside of which is a spar, or fossil, of a bright glittering appearance, resembling spangles of gold and silver, as solid as the mineral itself, and of a greater specific gravity. This being taken off, the mineral is solid, unconnected with any other substance, of a broad grain, and what mineral-ogists call potters' ore.

In other mines, in the vicinity of the above, the lead is found in regular veins, from two to four feet in thickness, containing about fifty ounces of silver in a ton; but at the depth of twenty five feet the operations are impeded by water. The whole of this mineral tract is very rich and ex-

tensive.

In Great Britain there are numerous lead mines, among which may be cited that of Arkingdale, in Yorkshire, and those with which Shropshire abounds. In the south of Lanerkshire, and in the vicinity of Wanlock-head, Scotland, are two celebrated lead mines, which yield annually above two thousand tons of metal. The Susannah-vein Lead-hills, has been worked for many years, and has been productive of great wealth. The above are con-

sidered as the richest lead mines of Europe.

Several of the Irish lead mines have yielded a considerable proportion of silver; and mention is made of one, in the county of Antrim, which afforded, in thirty pounds of lead, a pound of that metal. Another, less productive of silver, was found at Ballysadare, near the harbour of Sligo in Connaught; and a third in the county of Tipperary, thirty miles from Limerick. The ores of this last were of two kinds, most usually of a reddish colour, hard and glittering; the other, which was the richest in silver, resembled a blue mark. The works were destroyed in the Irish insurrections in the reign of Charles I. The mine, however, is still wrought on account of the lead it contains.

The following is the enumeration of the different substances in which metals are found. In granitic mountains, tin, lead, iron, sinc, bismuth, cobalt; and in gneifs, or schistose granite, silver, copper, lead, tin, and zinc. In raicaceous schist are found copper, tin, lead, and antimony. In hornblende slate, copper ore; and under argillate, or common slate, silver, copper, lead, and zinc. In steatite sulphureous pyrites, and magnet. In primitive lime-stone copper, lead, and zinc appear; and even in a strata of coal, native silver, galena, and manganese have been discovered.

COAL MINES.

Coals are scattered, with a more or less sparing hand, over every continent, and almost over every kingdom of the globe; but there is not any country where coal mines are so rich and so frequent as in Great Britain, the opulence of which has been principally ascribed to this valuable mineral.

It is, in truth, the very sool of her manufactures, and consequently of her commerce, every manufacturing town being established in the midst of a coal country. Of this striking instances are afforded by Bristol, Birmingham, Wolverhampton, Sheffield, Newcastle, and Glasgow.

The coals of Whitehaven and Wigan are esteemed the purest; and the cannel and peacock coals of Lancashire are so beautiful, that they are suspected by some to have constituted the gagates, or jet, which the ancients ascribed to Great Britain. In Somersetshire, the Mendip coalmines are distinguished by their productiveness: they occur there, as indeed in every other part, in the low country, and are not to be found in the hills. The beds of coal are not horizontal, but sloping, dipping to the south-east at the rate of about twenty two inches per fathom. Hence they would speedily sink so deep that it would not be possible to work them, were it not that they are intersected at interwals by perpendicular dykes or veins, of a different kind of mineral, on the other side of which these beds are found considerably raised up. They are seven in number, lying at regular distances beneath each other, and separated by beds of a different kind of substance, the deepest being placed more than two hundred feet beneath the surface of the carth.

The town of Newcostle, in Northumberland, has been

celebrated during several centuries for its very extensive trade in coals. It was first made a borough by William the Conqueror, and the earliest charter for digging coals, granted to the inhabitants, was in the reign of Henry III. in 1239; but in 1306, the use of coal for fuel was prohibited in London, by royal proclamation, chiefly because it injured the sale of wood, with which the environs of the Capital were then overspread. This interdict did not, however, continue long in force; and coals may be considered as having been dug for exportation at Newcastle for more than four centuries. It has been estimated that there are twenty-four considerable collieries lying at different distances from the river, from five to eighteen miles; and that they produced, for an average of six years, up to the close of 1776, an annual consumption of three hundred and eighty thousand chaldrons, Newcastle measure, (equal to neven hundred and seventeen thousand six hundred and Afteen chaldrons, London measure) of which about thirty thousand chaldrons were exported to foreign parts. The boats employed in the colliery are called keels, and are described as strong, clumsy, and oval, each carrying about twenty tons; and of these four hundred and fifty are kept constantly employed. In the year 1776 an estimate was made of the shipping employed in the Newcastle coaltrade; and from this estimate it appears, that three thousand, five hundred, and eighty-five ships, were during that year engaged in the coasting trade, and three hundred and sixty-three in the trade to foreign ports, their joint tonnage amounting to seven hundred and thirty-eight thousand, two hundred and fourteen tons.

It is a common opinion among geologists, that pit coal is of vegetable origin, and that it has been brought to its present state by the means of some chemical process, not at this time understood. However extravagant this opinion may at first sight appear, it is supported by the existence of vast depositions of matter, half way, as it were, between perfect wood and perfect pit coal; which, while it obviously betrays its vegetable nature, has in several respects so near an approximation to pit coal, as to have been generally distinguished by the name of coal. One of the most remarkable of these depositions exists in Devonshire, about thirteen miles south-west of Exeter, and is well

have a uniter the same of Havey coal. For regardie around has been accordanced by Mr. Harefiel, in a second experiments in which he bound both extractive metter and resingularity which belong to the regardle kingdom.

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The coal name of Whitehoven may be considered as the most extraordinary in the known world. They are executions which have in their structure, a considerable remarkation to the gypnum quarries of Paris, and are of such magnitude and extent, that in one of them alone, a same extent, extraord will a million striking, was, in the course of a cattery, extraord by the proprietors. Their principal catteries to by an opening at the bottom of a bill, through a long parange, hown to the costs, leading to the lawest vata of a mil. The greater part of this descent is through parabuse alterna, which continually intersect other polleties, which would form away, with the exception of large pullars, which, a bree the mine ratio to a considerable depth, are mine first in height, and about there experies a support the production and,

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mines in Hungary, Eeru, and elsewhere, being situated in mountainous countries, where the surface of the earth is elevated to a great height above the level of the ocean.

In these mines there are three strata of coal, which lie at a considerable distance one above the other, and are made to communicate by pits; but the vein is not always continued in the same regularly-inclined plane, the miners frequently meeting with hard rock, by which their further progress is interrupted. At such places there seem to have been breaks in the earth, from the surface downward, one pertion appearing to have sunk down, while the adjoining part has preserved its ancient situation. In some of these places the earth has sunk ten, twenty fathoms, and even more; while in others the depression has been less than one fathom. These breaks the miners call dykes; and when they reach one of them, their first care is to discover whether the strata in the adjoining part are higher or lower than in the part where they had been working; or, according to their own phrase, whether the coal be cast down or cast up. In the former case they aink a pit; but if it be cast up to any considerable height, they are frequently obliged, with great labour and expense, to carry forward a level, or long gallery, through the rock, until they again reach the strutum of coal.

Coal, the chief mineral of Scotland, has been there worked for a succession of ages. Pope Pius II. in his description of Europe, written about 1450, mentions that he beheld with wonder black stones given as alms to the poor of Scotland. This mineral may, however, be traced to the twelfth century; and a very early account of the Scottish coal mines, explains with great precision, the manner of working the coal, not neglecting to mention the subterraneous walls of whin which intersect the strata, particularly a remarkable one, visible from the river Tyne, where it forms a cataract, and passes by Prestonpans, to the shore of Fife. The Lothians and Fifeshire, particularly abound with this useful mineral, which also extends into Avrshire: and near Irwin is found a curious variety, named ribbon coal. A singular coal, in veins of mineral, has been found at Castle Leod, in the east of Rosshire; and it is conjectured that the largest untouched field of coal in Europe, exists in a barren tract of country in Lanerkshire. In North America, coal has been discovered in great

abundance on both sides of James river, and is said to have been first discovered by a boy in pursuit of cray fish. This valuable mineral also abounds towards the Mississippi and the Ohio, that of Pittsburgh being of a superior quality; but it is chiefly worked in Virginia, where the beds are very extensive. One of these beds, about twenty-four feet in thickness, was found to repose on granite, and is cited as a great singularity. In the territory south of the Ohio, what is called stone coal is found in the Cumberland mountains; and in 1804 a coal mine was discovered on the river Juniata, in the vicinity of the Apalachian moun-The bed is horizontal, on which account it is wrought with considerable advantage, and the mineral is upwards of ten feet in thickness. Notwithstanding these supplies at particular points of the extensive territory of the United States, coals are imported from Great Britain in very considerable quantities. In the space of one year, reckoning from the first of October, 1801, the importation amounted to not less than 18,473 chaldrons.

The process of mining is a combination of boring and digging. Shafts are sunk, levels are driven, and drains are carried off, by the help of picks or pick-axes, wedges, and hammers, the rocks being also sometimes loosened by blasting with gunpowder. In searching for coal, a shaft is sunk through the uppermost soft stratum, and the rock is then bored, by striking it continually with an iron borer terminating in an edge of steel, which is in the mean time turned partly round; and, at proper intervals, a scoop is let down to draw up the loose fragments. In this manner a perforation is sometimes made for more than an hundred fathoms, the borer being lengthened by pieces screwed on; it is then partly supported by a counterpoise, and worked by machinery. Should it happen to break, the piece is raised by a rod furnished with a hollow cone, as an extinguisher, which is driven down on it. The borer is sometimes furnished with knives, which are made to act on any part at pleasure, and to scrape off a portion of the surrounding substance, which is collected in a proper receptacle.

Those who have the direction of deep and extensive coal mines, are obliged, with great art and care, to keep them ventilated with perpetual currents of fresh air, which afford the miners a constant supply of that vital fluid, and expel

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from the mines damps and other noxious exhalations, together with such other burnt and foul air, as is become deleterious and unfit for respiration. In the deserted mines, which are not thus ventilated with currents of fresh air, large quantities of these damps are frequently collected; and in such works, they often remain for a long time-without doing any mischief. But when, by some accident they are set on fire, they then produce dreadful explosions, and, bursting out of the pits with great impetuosity, like the fiery eruptions from burning mountains, force along with them ponderous bodies to a great height in the air.

Various instances have occurred in which the coal has been set on fire by the fulminating damp, and has continued burning for several months, until large streams of water were conducted into the mine, so as to inundate the parts where the conflagration existed. By such fires several collieries have been entirely destroyed, in the vicinity of Newcastle, and in other parts of England as well as in Fifeshire in Scotland. In some of these places the fire has continued to burn for ages. To prevent, therefore, as much as possible, the collieries from being filled with these pernicious damps, it has been found necessary carefully to search for the crevices in the coal whence they issue, and, at those places, to confine them within a narrow space, conducting them through large pipes into the open air, where, being set on fire, they consume in perpetual flame as they continually arise out of the earth.

The late Mr. Spelling, engineer of the Whitehaven coal mines, having observed that the fulminating damp could only be kindled by flame, and that it was not liable to be set on fire by red-hot iron, nor by the sparks produced by the collision of flint and steel, invented a machine called a steel-mill, in which a wheel of that metal is turned round with a very rapid motion, and, by the application of flints, great plenty of sparks are emitted, which afford the miners such a light as enables them to carry on their work in close places, where the flames of candle, or of a lamp, would, as has already happened in various instances, occasion violent explosions. In that dreadful catastrophe, the explosion of the Felling Colliery, the particulars of which will be hereafter detailed, it will be seen that mills of this description were employed, in searching for the remains of

the sad victims of the disaster; but this event happened before the invention of Sir Humphrey Davy's safety lamp, a discovery which, while it affords a more certain light, holds out every security to the miner against accidents which, without such a resource, might still be superadded to those already recorded, as arising from the flame of a candle or lamp.

A greater number of mines have, however, been ruined by inundations than by fires; and here that noble invention the fire-engine displays its beneficial effects. It appears from nice calculations, that it would require about 550 men, or a power equal to that of 110 horses, to work the pumps of one of the largest fire-engines, having a cylinder of seventy inches diameter, now in use, and thrice that number of men to keep an engine of that size constantly at work. It also appears that as much water may be raised by such an engine, as can be drawn, within the same space of time, by 2520 men with rollers and buckets, after the manner now daily practised in many mines; or as much as can be bourne on the shoulders of twice that number of men, as is said to be done in several of the mines of Peru. So great is the power of the elastic steam of the boiling water in those engines, and of the outward atmosphere, which, by their alternate actions, give force and motion to the beam, and, through it, to the pump rods which elevate the water through tubes, and discharge it from the mine!

There are four fire-engines belonging to the Whitehaven colliery, which when all at work, discharge from it about 1228 gallons of water every minute, at thirteen strokes; and at the same rate, 1,768,320 gallons, upwards of 7000 tons, every twenty-four hours. By these engines nearly twice the above-mentioned quantity of water might be discharged from mines which are not above sixty or seventy fathoms deep, which depth is rarely exceeded in the Newcastle collieries, or in any other English collieries, with the exception of the above.

Coal pits have some times taken fire by accident, and have continued to burn for a considerable length of time. About the year 1648, a coal mine at Benwell, a village near Newcastle-upon-Tyne, was accidentally kindled by a candle: at first, the fire was so feeble, that a reward of half a crown, which was asked by a person who offered to ex-

tingaish it, was refused. It gradually increased, however, and had continued burning for thirty years, when the account was drawn up and published in the Philosophical Transactions: it was not finally extinguished until all the fuel was consumed. Examples of a similar kind have happened in Scotland and in Germany

FELLING COLLIERY.

But of all the recorded accidents relative to coal mines, that of Felling Colliery, near Sunderland, a concise narrative of which here follows, was the most disastrons.

FELLING is a manor about a mile and a half east of Gateshead. It contains several strata of coal, the uppermost of which were extensively wrought in the beginning of the last century. The stratum called the High-main, was won in 1779, and continued to be wrought till the 19th January, 1811, when it was entirely excavated. The present colliery is in the seam called the Low-main. It commenced in October, 1810, and was at full work in May. 1812. This mine was considered by the workmen as a model of perfection in the purity of its air, and orderly arrangements-its inclined plane was saving the daily expense of at least 13 horses—the concern wore the features of the greatest possible prosperity, and no accident, except a trifling explosion of fire-damp slightly burning two or three workmen, had occurred. Two shifts or sets of men were constantly employed, except on Sundays. Twentyfive acres of coal had been excavated. The first shift entered the mine at 4 o'clock A. M. and were relieved at their working posts by the next at 11 o'clock in the morning. The establishment it employed under-ground, consisted of about 128 persons, who, from the 11th to the 25th of May, 1812, wrought 624 scores of coal, equal to 1300 Newcastle chaldrons, or 2455 London chaldrons.

About helf past 11 o'clock on the morning of the 25th of May, 1812, the neighbouring villages were alarmed by a tremendous explosion in this colliery. The subterraneous fire broke forth with two heavy discharges from the Lew-main, which were almost instantaneously followed by one from the High-main. A slight trembling as from an earthquake, was felt for about half a mile around the workings; and the noise of the explosion, though dull, was

heard to three or four miles distance, and much resembled

an unsteady fire of infantry.

Immense quantities of dust and small coal accompanied these blasts, and rose high into the air, in the form of an inverted cone. The heaviest part of the ejected matter, such as corves, pieces of wood, and small coal, fell near the pits; but the dust, borne away by a strong west wind, fell in a continued shower from the pit to the distance of a mile and a half. As soon as the explosion was heard, the wives and children of the workmen ran to the pit; the scene was distressing beyond the power of description.

Of one hundred and twenty-eight persons in the mine at the time of the explosion, only thirty-two were brought to day-light, twenty-nine survived the fatal combustion, the rest were destroyed. Nor from the time of the explosion till the 8th of July, could any person descend. But after many unsuccessful attempts to explore the burning mine, it was re-closed, to prevent the atmospheric air from entering it; this being done, no attempt was afterwards made to explore it, till the morning of the last mentioned day; from which time to the 19th of September, the heartrending scene of mothers and widows examining the putrid bodies of their sons and husbands, for marks by which to indentify them, was almost daily renewed; but very few of them were known by any personal mark, they were too much mangled and scorched to retain any of their features. Their clothes, tobacco-boxes, shoes, &c. were, therefore, the only indexes by which they could be recognised.

At the crane twenty-one bodies lay in ghastly confusion: some like mummies, scorched as dry as if they were baked. One wanted its head, another an arm. The scene was truly frightful. The power of fire was visible upon them all; but its effects were extremely variable: while some were almost torn to pieces, there were others who appeared as if they had sunk down overpowered by sleep.

The ventilation concluded on Saturday the 19th of September, when the ninety-first body was dug from under a heap of stones. At six o'clock in the morning the pit was visited by candle-light, which had not been used in it for the space of one hundred and seventeen days; and at 11 o'clock in the morning the tube furnace was lighted. From this time the colliery has been regularly at work; but the ninety-second body has never yet been found. All these persons, except four, who were buried in single graves, were interred in Heworth Chapel-yard, in a treach, side by side, two coffins deep, with a partition of brick and lime between every four coffins.

MISCELLANEOUS SUBJECTS CONNECTED WITH MINERALOGY.

CLIFTON HOT-WELL.

THE warm spring, or fountain, called THE HOT-WELL, in the parish of Clifton, is said to be so copious as to discharge sixty gallons of water in a minute. It rises forcibly from an aperture in the solid rock, at about twenty-six feet below high-water mark, and ten feet above low-water. On its immediate influx from the rock, the water is much warmer than when it is pumped up for drinking; and it also feels and tastes warmer in winter than in summer, and in very cold days heats the glass into which it falls from the cock. In 1695, this celebrated spring, after having fallen into neglect, was recovered, and the Hot-wellhouse erected, proper foundations being made for the pumps, by which the water is raised to the height of thirty feet: pipes are contrived, through which the waste water runs into the river; and in these pipes are valves, which open to let out the water, but shut when the tide is rising.

With respect to the qualities of this mineral water, it is natural to suppose that in its subterraneous passage through the rocks, over different strata, and among such variety of mineral and other substances, it must be impregnated with their several virtues. In the common spring water of the neighbouring rock-house, on a trial being made, the mercury in Fahrenheit's thermometer stood at fifty degrees, while that of the Hotwell, taken immediately from the pump, raised it to seventy-six degrees; and as the heat of a person in health seldom exceeds the ninety-sixth degree, it follows, that the Bristol water possesses somewhat more than three-fourths of the human heat.

Below the Hotwell-house rises a magnificent range of

rocks, which are not more remarkable for their height, than for their being equally so on both sides the river, the strata in some places answering on each side for about a mile and a half in a serpentine course. These constitute one of the greatest natural curiosities in England. The rock beyond the Hotwell, and on the same side, is named ST. VINCENT's, a chapel dedicated to that saint having been formerly built on its summit. It is in height three hundred feet, and has a majestic appearance. It supplies the naturalist with many curious fessils; the botanist with a variety of scarce plants; the antiquary with the remains of a Roman camp; and the less curious enquirer with a view of a most dreadful and surprising precipice.

The rocks in general, when broken up, are of a dusky red, brown, or chocolate colour marble, very hard and close grained, and which, on being struck with a hammer, emit a strong sulphureous smell. It will bear a polish equal to any foreign marble; and, when sawed into slabs and polished, appears beautifully variegated with veins of white, blueish grey, or yellow. It is often employed for chimney pieces; but is principally used for making lime, for which purpose there is not any stone in England so well calculated, nor is there any lime so strong, fine, and white, which excellent qualities occasion great demand for foreign con-

sumption.

Here, and 'in the vicinity, labourers are daily employed in blowing up the rocks with gunpowder, by which process vast fragments are frequently thrown down, and repeatedly strike the precipice with a dreadful crash, which, combined with the loud report of the explosion, re-echoed from side to side by the lofty cliffs, makes a grand and awful noise resembling thunder, for which it is frequently mistaken by strangers. It is the opinion of the greater part of those who have viewed these rocks, that they were once united, and were separated by some terrible convulsion of nature. A bridge of one arch, from rock to rock, over the Avon, has long been in contemplation; but if the blowing up of these rocks should still be persisted in, the design will be rendered impracticable. This is the more to be regretted, because stone of the same quality is to be procured in Durham-down, or lower down the river.

In the fissures and cavities of these rocks are found those

fine crystals called BRISTOL STONES, OR BIANONES, some of which are so hard as to cut glass, and are exceedingly clear, colourless, and brilliant. When set in rings, in their natural state, these have appeared of as high a polish and lustre as if they had been wrought by the most skilful

lapidary.

Bristol is surrounded by coal-pits, those of Gloucester-shire being at Kingswood, and those of Somerset at Bedminster, Ashton, Nailsea, and Brislington. But the most copious supply is from Kingswood, where there are a great number of pits and colliers' houses, which last are so frequent, that Kingswood, viewed from the neighbouring hills, has the appearance of being one vast rural suburb of Bristol.

DIAMONDS AND PRECIOUS STONES.

In addition to the information relative to DIAMOND MINES, at p. 259, et seq. of this work, the reader will not fail to be gratified by some curious particulars relative to these and the other more precious gems, drawn from the valuable treatise of Mr. Mawe, on this interesting subject.

In the history of the human race, there are few things which at first sight appear so remarkable, as the prodigious value which, by common consent, in all ages, and in all civilized countries has been attached to the diamond. That a house with a large estate, the means of living, not only at ease but in splendour, should be set in competition with, and even he deemed inadequate to the purchase of a transparent crystallized stone, not half the size of a hen's egg seems almost a kind of insanity. It would, indeed, truly deserve this name, if the purchaser were to part with what the seller would acquire by such a transfer. If, for the consciousness of possessing a diamond of nearly threequarters of an ounce weight, a country gentleman were to pay ninety thousand pounds in ready money, and an annuity of four thousand pounds besides, he would very deservedly, incur some risk of a statute of lunacy; yet, not only the above sum was given, but a patent of nobility into the bargain, by the Empress Catharine of Russia, for the famous diamond of Nadir Shah. In this case, however, although the seller acquired much, the purchaser did not undergo any personal privation; and, in reality, notwithcoming the coefficient and laple estimation of illuminate, they are not just to competition with the automation combined and consecutions to the. Among community and have conducted the tripless such. Even hardens, presented they represented the highest such. Even hardens, presented they represented to the such as the tripless of their probability, there or four remaining verse at the matrix of their mental years. These means he, therefore, in the nature of their wines also present to the interest of their wines at their such as the such as the probability of the nature of their successions as a section object of suggests.

The utility of the channel, good as it is in some respects, or test the fittle or continue into the calculation of its price; as test all thus portion of its value which constitutes the difference between the cost of an entire dismond and an equal weight of diamond powder, must be attributed to

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The bounty of this gam, depending on its unrivalled beare, in purdoular, the circumspance which originally because it turn matter, and still continues to uphold it in the public extension; and cerumity, notwithstending the quality of at its balls, there is not any substance, outured or modulatel, who have meaning any comparison with it The right and encions retreations of the equal, the retresting trute of the emergial, the empirer and to-cutiful light which services from the six-cayed two of the opposed, the sections colours, conditions with high liveres. polished distriction the rate, the complete, and the suppress be smilled as they are as a near inquestion, new aboves was much less in a diament behalder; whereas the diament, weathern any exempted colour of the own, imbilious the spare scalar 103, and then reflects it, etting with qualimental medesiretts, the white and the vivid to be unfamed for more there are treatment by the most immediate age, or designment by refinement into these printedly colours which mains the parables, and the marginian and complete change, conducted weeks a twilliamcy which yields, and hardly vields, in that of the meridian was. Other come, interred with one und braceders are his time by the moures; and, if they attract the nutice of the bearings divide their streeting, and with draw thuse segreda which mught to be concentred on the parame to the mendy account orenaments. The disavoid on the contrary, whether likening on the errors of

state, or diffusing its starry radiance from the breast of titled merit, or "in courts of feasts and high solemnities," wreathing itself with the hair, illustrating the shape and colour of the neck, and entering ambitiously into contest with the lively lustre of those eyes that "rain influence" on all beholders, blends harmoniously with the general effect, and proclaims to the most distant ring of the surrounding crowd, the person of the monarch, of the knight,

or of the beauty.

Another circumstance tending to enhance the value of the diamond is, that although small stones are sufficiently abundant to be within the reach of moderate expenditure. and therefore afford, to all those who are in easy circumstances an opportunity to acquire a taste for diamonds, yet those of a larger size are, and ever have been, rather rare; and of those which are celebrated for their size and beauty. the whole number, at least in Europe, scarcely amounts to half a dozen, all of them being in possession of sovereign princes. Hence, the acquisition even of a moderately large diamond, is what mere money cannot always command a and many are the favours, both political and of other Mads, for which a diamond of a large size, or of uncommon beauty, may be offered as a compensation, where its commercial price, in money, neither can be tendered, nor would be received. In many circumstances also, it is a matter of no small importance for a person to have a considerable part of his property in the most portable form possible; and in this respect what is there that can be compared to diamonds which possess the portability, without the risk, of bills of exchange? It may further be remarked, in favour of this species of property, that it is but little liable to fluctuation. and has gone on pretty regularly increasing in value, insomuch that the price of stones of good quality is considerably higher than it was some years ago.

THE ART OF CUTTING AND POLISHING DIAMONDS has a twofold object; first, to divide the natural surface of the stone in a symmetrical manner, by means of highly-polished polygonal planes, and thus to bring out, to the best advantage, the wonderful refulgence of this beautiful gem; and, secondly, by cutting out such flaws as may happen to be near the surface, to remove those blemishes which materially detract from its beauty, and consequently from its value.

The removal of flaws is a matter of great importance, for, owing to the form in which the diamond is cut, and its high degree of refrangibility, the smallest fault is magnified, and becomes obtrusively visible in every face. For this reason also, it is by no means an easy matter, at all times, to ascertain whether a flaw is, or is not, superficial; and a person with a correct and well practised eye, may often purchase to great advantage stones which appear to be flawed quite through, but are, in fact, only superficially blemished.

The most esteemed, and, at the same time, nearest colour of the ORIENTAL RUBY, is pure carmine, or blood red of considerable intensity, forming, when well polished, a blaze of the most exquisite and unrivalled tint. It is, however, more or less pale, and mixed with blue in various proportions: hence it occurs rose-red and reddish-white, crimson, peach-blossom-red, and lilac-blue, the latter variety being named oriental amethyst. It is a native of Pegu, and is said to be found in the sand of certain streams near the town of Sirian, the capital of that country: it also occurs, with sapphire, in the sands of the rivers of Ceylon. A ruby perfect both in colour and transparency, is much less commou than a good diamond, and when of the weight of three or four carats, is even more valuable than that gem. The King of Pegu, and the monarchs of Ava and Siam, monopolize the finest rubies, in the same way as the Sovereigns of India make a monopoly of diamonds. The finest ruby in the world is in possession of the first of these Kings; its purity has passed into a proverb, and its worth, when compared with gold, is inestimable. The Subah of the Decan. also, is in possession of a prodigiously fine one, a full inch in diameter. The princes of Europe cannot boast of any of a first rate magnitude.

The ORIENTAL SAPPHIRE ranks next in value to the ruby: when perfect, its colour is a clear and bright Prussian blue, united to a high degree of transparency. The ASTERIAS, or STAR-STONE, is a remarkable variety of this beautiful gem: it is semi-transparent, with a reddish purple tinge.

The view of a silver mine, plate No. 40, accompanied by that of a natural road under the mountain of Filifeld,

Norway, situated in a territory which abounds with mineral productions. This natural curiosity is so well exhibited in this plate, as not to need a particular description.

SALT MINES.

Hence with fillinive salt old ocean steeps. His amerakt shallows, and his sapphire deeps. Oft in wide lakes, around their warmer, brim, In hollow pyramids the crystals swim; Or, fused by earth-born fires, in cubic blocks Shoot their wide forms, and harden into rocks.

DARWIN.

CULINARY sult, or, as it is termed in chemistry, muriat of moda, exists abundantly in a native state, both in a solid form, and dissolved in water It occurs, in solution, not only throughout the wide range of the ocean, but in various springs, rivers, and lakes; and is known, in its solid form. as a peculiar mineral, under the names of rock-calt, fossilsalt, and salt-gem. Its beds are mostly beneath the surface of the ground, but sometimes rise into hills of considerable elevation. At Cordova, in Spain, a hill, between four and five hundred feet in height, is nearly composed of this mineral. But the most celebrated salt mines are those of Wielicza in Gallicia, commonly called the salt mines of Cracow, those of Tyrol, of Poland, of Castille in Spain, and of Cheshire in England. In the province of Lahor, in Hindostan, is a bill of rock-salt of equal magnitude with that near Cordova. The mines of Iletski, in Russia, yield vast quantities of this substance. It is so plentiful in the desert of Caramania, and the air so dry, that it is there used as a material for building. It forms the surface of a large part of the northern desert of Lybia; and is found in great abundance in the mountains. of Peru. It has a pure seline taste, without any mixture of bitterness; and chrystalizes in cubes when obtained by slow evaporation from its solution. In Germany the mines. of this kind are numerous: one of the largest is that of Hallein, near Saltsburg, in which the salt is hewn out from subterraneous caverns of a considerable range, and exhibits almost every diversity of colour, as yellow, red, blue, and white; in consequence of which it is dissolved in water, to be liberated from its impurities, and afterwards re-crystalized. The salt mines of Cracow, and those of Cheshire, merit a particular description.

SALT MINES OF CRACOW.

Thus, cavern'd round, in Cracow's mighty mines. With crystal walls a gorgeous city shines : Scoop'd in the briny rock long streets extend Their hoary course, and glittering domes ascend : Down their bright steeps, emerging into day, Impetuous fountains burst their headlong way, O'er milk-white vales in ivory channels spread, And wondering seek their subterraneous bed. Form'd in pellucid salt, with chissel nice, The pale lamp glittering through the sculptur'd ice. With wild reverted eyes fair Lotta stands, And spreads to heaven, in vain, her glassy hands; Cold dews condense upon her pearly breast, And the big tear rolls lucid down her vest. Far gleaming o'er the town, transparent fanes Rear their white towers, and wave their golden vanes; Long lines of lustres pour their trembling rays, And the bright vault resounds with mingled blaze.

DARWIN.

These celebrated excavations are about five miles distant from the city of Cracow, in a small town named Wielicza, which is entirely undermined, the cavities reaching to a considerable extent beyond its limits. The length of the great mine, from east to west, is six thousand feet; its breadth, from north to south, two thousand; and its greatest depth eight hundred; but the veins of salt are not limited to this extent, the depth and length of them, from east to west, being yet unknown, and their breadth only hitherto determined. There are at present ten shafts, but not a single spring has been discovered throughout the extent of the mine.

In descending to the bottom, the visitor is surprised to find a kind of subterraneous commonwealth, consisting of many families, who have their peculiar laws and polity. Here are likewise public roads and carriages, horses being employed to draw the salt to the mouths of the mine, where it is taken up by engines. These horses, when once arrived at their destination, never more see the light of the sun; and many of the people seemed buried alive in this strange abyss, having been born there, and never stirring out; while others are not denied frequent oppor-

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tunities of breathing the fresh air in the fields, and enjoying the surrounding prospects. The subterraneous passages, or galleries are very spacious, and in many of them chapels are kewn out of the rock-salt. In these passages crucifixes are set up, together with the images of saints, before which a light is kept constantly burning. The places where the salt is hewn out, and the empty cavities whence it has been removed, are called chambers, in several of which, where the water has stagnated, the bottoms and sides are covered with very thick incrustations of thousands of salt crystals, lying one on the other, and many of them weighing half a pound and upwards. When candles are placed before them, the numerous rays of light reflected by these crystals emit a surprising lustre.

In several parts of the mine huge columns of salt are left standing, to support the rock; and these are very fancifully ornamented. But the most curious object in the inhabited part, or subterraneous town, is a statue which is considered by the immered inhabitants as the actual transmutation of Let's wife into a pillar of salt; and in proportion as this statue appears either dry or moist, the state of the weather above ground is inferred. The windings in this mine are so numerous and intricate, that the workmen have frequently lost their way; and several, whose lights have been extinguished, have thus perished. The number of miners to whom it gives employment, is computed at between four and five hundred; but the whole amount of the men employed in it is about.

seven hundred.

The salt lies near the surface, in large shapeless masses out of which blocks of sixty, eighty, or a hundred feet square, may be hewn; but at a considerable depth it is found in smaller lumps. About six hundred thousand quintals of salt are dug annually out of the mines of Cracow. The worst and cheapest is called green salt, from its greenish colour, occasioned by an heterogenous mixture of a greyish mineral, or clay, and entirely consists of salt crystals of different dimensions. A finer sort is dug out in large blocks; and the third kind is the sal gemma, or crystal salt, which is found in small pieces interspersed in the rock, and, when detached from it, breaks into cubes of rectangular prisms. This is usually sold unprepared:

The colour of the salt stone is a dark grey mixed with yellow.

SALT MINES AND SALT SPRINGS OF CHRSHIRE.

THE Cheshire rock-salt, with very few exceptions, has hitherto been ascertained to exist only in the vallies bordering on the river Weaver and its tributary streams; in some places manifesting its presence by springs impregnated with salt, and in others being known by mines actually carried down into the substance of the salt strata. Between the source of the Weaver and Nantwich, many brine springs make their appearance; and occur again at several places, in proceeding down the stream. At Moulton, a mine has been sunk into the body of rock-salt, and a similar mine is wrought near Middlewich. At Northwich, brine springs are very abundant; and there also many mines have been sunk for the purpose of working out the tossil salt. In that vicinity a body of rock salt has been met with in searching for coal.

The brines in this district are formed by the penetration of spring or rain waters to the upper surface of the rock salt, in passing over which they acquire such a degree of strength, that one hundred parts have yielded twenty-seven of pure salt, thus nearly approaching to the perfect saturation of brine. Their strength is therefore much greater than that of the salt springs met with in Hungary, Germany, and France. The brine having been pumped out of the pits, is first conveyed into large reservoirs, and afterwards drawn off as it is needed, into pans made of wrought iron. Here heat is applied in a degree determined by the nature of the salt to be manufactured, and various additions are made to the brine, with a view either to assist the crystallization of the salt, or to promote the separation of the earthy particles, which exist in a very small proportion. The importance of the manufacture of Cheshire salt will be sufficiently obvious from the statement, that, besides the salt made for home consumption, the annual amount of which exceeds 16,000 tons, the average of the quantity sent yearly to Liverpool for exportation, has not been less than 140,000 tons.

The mine of rock salt first worked was discovered by accident at Marbury, near Northwich, about a century and a half ago; and this bed had been wrought for more than a century, when, in the same neighbourhood, a second and inferior stratum was fallen in with, separated from the former by a bed of indurated clay. This lower stratum was ascertained to possess a very great degree of purity, and freedom from earthy admixture; on which account, and from the local advantages of Northwich for exportation. the fossil salt is worked in the vicinity of that place only. It occurs in two great strata or beds, lying nearly horizontally, and separated, the superincumbent from the subjacent stratum, by several layers of indurated clay, or argillaceous stone. These intervening beds possess in conjunction a very uniform thickness of from thirty to thirtyfive feet, and are irregularly penetrated by veins of fossil salt. There is every reason to believe that the beds of rock salt at Northwich, are perfectly distinct from any others in the salt district, and form what are termed by mineralogists incumbent bodies or masses of mineral.

These enormous masses stretch a mile and a half in a longitudinal direction from north-east to south-west; but their transverse extent, as measured by a line at right angles from the former, does not exceed 4,200 feet, somewhat more than three quarters of a mile. Without this area, the brine which is met with is of a very weak and inferior quality, and at a short distance disappears altogether. The thickness of the upper bed varies from sixty to ninety feet; and a general estimate made from its level, shows that its upper surface, which is ninety feet beneath that of the earth, is at least thirty-six feet beneath the low water mark of the sea at Liverpool-a fact not unimportant in determining the nature of the formation of this mineral. The thickness of the lower bed has not hitherto been ascertained; but the workings are usually begun at the depth of from sixty to seventy-five feet, and are carried down for the space of fifteen or eighteen feet, through what forms the purest portion of the bed. In one of the mines a shaft has been sank to a level of forty-two feet still lower, without passing through the body of rock-salt. There is thus an ascertained thickness of this bed of about a hundred and twenty feet, and without any direct evidence that it may not extend to a considerably greater depth.

Although two distinct beds only of fossil salt have been

my with as Northwich, it has been accurational therefore and Handantians do and executional the whole at the sale district. As Lawren, have the profess of the grave Wheelarb, there distinct here have been bound, aspotated he erean of informed clay ; one or the depth of the feet, tions love to their news; it as senior, their is not havened, touch to the house, excit a fluid. Firely-five first loveled; desired, which no mak hitu seventy-turn nert, without par line through its autotunes. The intervious of is, the sine men of which is gory prouting, in culting the unapper up . see and the treat mater which posses throw it its power he the expressive apportation of Boshing Man. The spiller will out appear too strong, when it is no pringed that to be mile in which the weeting of stricts and token, and others the adverse metal was toring at the depth of about childs. are the quantity of water assertained to brace from the perce to one name, was not loss than three hundred and the gallines accommission which greatly changes up difficulty of posseng a short down to the hedy at each.

In many of these tests of position come evene, a partial of salt, onth matte arrang to affect the facts, in found to uglat ; and this saltanes increases, as about he expected, in proportion to the harty of each out to appropried the the steam or layers immediately above the rock, which the all the mines are perfectly unlivered to their appraisance and remained it to particularly remarkable, nonventionables there me und, in these many, any vetes of the besit and served with the great mass below. On the convers, the line between the day and ruck-cult in dearer with great distinctions in exceptionaire, without presenting any of Door ampacities which would after them a undust princthatten of the atrace. Not any marine rangin, or organic committee, are bound in the small show the real-out a and that adopted appearing measurement of exputing by constraints with moth of family only, in a face will many description of whe servation, because it appears, not only in the is intime, but the in the cale mine of Housey, follows, and Prancy ! rando, no which recount Wreter, in his presentatic synnon, emigne to the encirculity and flucts go forum to conjunct

The familiant extremel from the Northwich other is at Millerent degrees of purity, and more or less the mind

with earthy and metallic substances. The purer portion of the lower bed yields a rock-salt, which, being principally exported to the Baltic, obtains the name of Prussian rock. The extent of the cavity formed by the workings varies in different mines, the average depth being about In some of the pits, where pillars from eightsixteen feet. een to twenty-four feet square form the supports of the mine, the appearance of the cavity is singularly striking, and the brilliancy of the effect is greatly increased when the mine is illuminated by candles fixed to the sides of the rock. The scene thus formed almost appears to realise the magic palaces of eastern poets. Some of the pits are worked in aisles or streets, but the choice here is wholly arbitrary. Among the methods employed in working out the rock-salt, the operation of blasting is applied to the seperation of large masses from the body of the rock, and these are afterwards broken down by the mechanical implements in common use. The present number of mines is eleven or twelve, from which there are raised, on an annual average, fifty or sixty thousand tons of rock-salt. The greater part of this quantity is exported to Ireland and the Baltic, the remainder being employed in the Cheshire district, in the manufacture of white salt by solution and subsequent evaporation.

The general situation occupied by the rock-salt in Cheshire is very similar to that of the Transylvanian and Polish mines, the beds of this mineral being disposed in small plains, bounded by hills of inconsiderable height, forming a kind of basin or hollow, from which there is usually only a narrow egress for the waters. The situation of the Austrian salt mines near Saltzburg is, however, very different. The mineral there appears to be disposed in beds of great thickness, which occur near the summits of limestone hills, at a great elevation above the adjoining country. This is a singular fact; and if the hypothesis be allowed that rock-salt is formed from the waters of the sea, it is necessary to suppose the occurrence on this spot of the

most vast and surprising changes!

The theory of the formation of rock-salt presents some difficulties, at the same time that little doubt can exist of the general fact, that the beds of this mineral have been formed of deposition from the waters of the sea. Such an

epinion acquires much probability from the situation in which these beds usually occur; occupying the vallies and lower parts of the plains which are so surrounded by hills of secondary formation, as to leave only a narrow egress for the waters collected on their surface. The structure of the plain which constitutes the salt district of Cheshire, regarded in its general character, leads strongly to the conclusion that the waters of the sea must, at some former period, have occupied the lower parts at least of the basin thus formed, which at that time had a level lower by two hundred and fifty or three hundred feet than the one now appearing. To account for the great depositions of salt in the lower part of this basin, it is necessary to suppose that some barrier must have been afterwards interposed to prevent the free communication of the waters of the sea with those thus collected; and the general course of the streams, the position of the beds of rock-salt, and the contractions in the valley of the Weaver, which appear below Northwich at Anderton and Frodsham, point out with some distinctness the place where these obstructions may probably have occurred.

The principal objection to this theory undoubtedly is, the non-existence of marine exuviæ, either in the rock-salt, or in the adjacent strata of clay; a fact very difficult to connect with the idea of a deposition from the waters of the sea. Other objections, though, perhaps of less moment, arise from the appearance of the earthy salts in smaller proportion in the rock salt than in sea water; from the apparently partial depositions of the beds; and from the difficulty of explaining the formation of certain figured appearances which occur in the substance of the rock. These circumstances, however, by no means authorize the rejection of the general idea which has been given of the origin of this mineral, strengthened as it is by the situation and appearances observed in the foreign salt mines, where the proofs of marine deposition are still stronger than

those presented in the Cheshire district.

PHENOMENA OF THE OCEAN.

They that go down to the sea in ships, that do business in great waters; these see the works of the Lord, and his wonders in the deep.—PSALMS.

With wonder mark the moving wilderness of waves, From pole to pole through boundless space diffused, Magniscently dreadful! where, at large, Leviathan, with each inferior name Of sea-born kinds, ten thousand thousand tribes, Find endless range for pasture and for sport.

Adoring own

The Hand Almighty, who in channelled bed Immeasurable sunk, and poured abroad, Fenced with eternal mounds, the fluid sphere; With every wind to waft large commerce on. Join pole to pole, consociate severed worlds, And link in bonds of intercourse and love Earth's universal family.

MALLET.

THAT huge mass of waters impregnated with salt, which encompasses all parts of the globe, and by the means of which, in the present improved state of navigation, an easy intercourse subsists between the most distant nations, is denominated THE OCEAN, and has three grand divisions assigned to it. First: That vastexpanse of water which lies to the westward of the northern and southern continents of America, and by which those continents are divided from Asia. On account of the uniform and temperate gales which sweep its surface within the tropics, it is named "the Pacific Ocean;" and has again been distinguished into the Northern and Southern Pacific, the equator heing considered as the boundary of each, and "the Southern Ocean," or South Sea, being, consequently, that part of the general assemblage of waters which roll in the direction from about the fortieth degree of latitude towards the south pole. Its general width is estimated at about ten thousand miles. Secondly: The "Atlantic Ocean." which divides Europe and Africa from the two American continents, and has a general width of about three thousand miles; while the waters which occupy the polar regions are named "The Northern sea." And, fastly: "The Indian Ocean," which extends from the remove the same present a task out the presenting men.

Account the chief in three two expensive absoluted by water, properly unified area, may be distributed the Galife, the structure of the Galife, the structure of the Galife, the structure of the Galife, with more properly, based bone styled a lake; has as its water, processed by land, order of the quality of saltheres, it is translate around the case. It is, notwith that hake improve, as North America, has a still greater arctimitationar, assumed a count of the desire of forther hindress in the ariting account in almost a forther hindress in the ariting the extent of the Coupling down and account to the coupling down accoun

Of the circum at the situation into different some, and again infligence depths. Title is known a burst to highly presente that energy of the harper convenience and payritions new met with, leave execute, without much change as to that exist from the countries. Offices have ambienhardly, using the result of that emilies which is preparently taking place between the channots of least and energy, and which was, for the greater pay, given the to blanch, retination, and partitionally a while subsectionable everylates of countries the countries, and there exists an entire that we had continued an interest and countries amplitive, between the character materials below that the entire tendence and countries amplities, between and continued in the notation of the estimates the entire and continued in the notation of the estimates and themselves and the estimates.

The quantity of water to the moon set only remains actually the same, but, notwellatendly, its mean yelests and the execute authors, continues shall within arrange limits. That, less eye, is what count to obtain within carries also was a which the count to inhie, from the patient of secretar methods that occurs to inhie, from the patient of secretar means to to a superferenced that some successful manners, it is a may express resident of the same successful manners, and a may be apprehended that some successful manners, and structure as to say us may supermed the dock, which are successful, and struct it above the include manners. It is, an adventually a the manner of the manners of the occurs. The same property for the alimings at the factors of the occurs. The country for the alimings at the factors of the occurs.

stable, if its density be less than the mean density of the earth, which is known to be the case. He has likewise determined, by means of his refined analysis; that this stability would cease to exist, if the mean density of the sea were to exceed that of the earth; so that the stability of the equilibrium of the ocean, and the excess of the density of the terrestrial globe above that of the waters which cover it, are reciprocally connected with each other, and indicate infinite wisdom and contrivance in such an adjustment.

SALTNESS OF THE SEA.

Or the various phenomena of the sea, that of its saltness is one of the most obvious. No questions concerning the natural history of our globe have been discussed with more attention, or decided with less satisfaction, than that concerning its primary cause, which had perplexed the philosophers before the time of Aristotle, and surpassed even the great genius of that profound enquirer into natural causes. Father Kircher, after having consulted not less than thirty-three authors on this subject, could not help remarking, that the fluctuations of the ocean itself were scarcely more various, than the opinions concerning the

origin of its saline impregnation.

This question does not seem capable of admitting an illustration from experiment; at least, not any experiments have been hitherto made for that purpose: it is, therefore, not surprising that it remains nearly as problematical in the present age, as it has been in any of the preceding. Had observations been made three or four centuries ago, to ascertain the then saltness of the sea, at any particular time and place, we might now, by making similar observations at the same place, in the same season, have been able to know, whether the saltness, at that particular place, was an increasing, or a decreasing, or an invariable quantity. This kind and degree of knowledge would have served as a clue to direct us to a full investigation of this matter in general. It is to be regretted, however, that observations, of this nature have not, until very lately, been made with any degree of precision.

One of the principal opinions maintained on this subject by modern philosophers, and more particularly supported by Doctor Halley, is, that since river water, in almost every part of the globe, is impregnated, in a greater or less degree, by sea-salt, the sea must have gradually acquired its present quantity of salt from the long continued influx of rivers. The water which is carried into the sea by these rivers, is again separated from it by evaporation, and being dispersed over the atmosphere by winds, soon descends in rain or vapour upon the surface of the earth, whence it hastens to pour into the bosom of the ocean the fresh tribute of salt it has collected in its inland progress. Thus the salt conveyed into the sea not being a volatile substance, nor performing an incessant circulation, must be a perpetually increasing quantity; and sufficient time, it is contended, has elapsed, since the creation, for the sea to ac-

quire from this source its present quantity of salt.

This opinion has been successfully combated; and it is denied that fresh water rivers can, in the course of many thousand years, have produced saltness in the sea. If this were the case, every sea, or great body of water, which receives rivers, must have been salt, and have possessed a degree of saltness in proportion to the quantity of water which these rivers discharge. But so far is this from being true, that the Palus Mæotis, and the great American lakes, do not contain salt water but fresh. It may indeed be objected, that the quantity of salt which rivers carry along with them, and deposit in the sea, must depend on the nature of the soil through which they flow, which may in some places not contain any salt; and that this is the reason why the great lakes in America, and the Palus Mæotis are iresh. But to this opinion, which is merely hypothetical, there are insurmountable objections. It is a curious fact, that the saltness of the sea is greatest under the line, and diminishes gradually towards the poles; but it cannot therefore be assumed that the earth contains more salt in the tropical regions than in the temperate zones, and more in these again than in the frigid zones. On the other hand, if it be allowed that the sea receives its saltness from the rivers, it must be equally salt, or nearly so, in every part of the earth; since, according to a simple and well known principle in chemistry, when any substance is dissolved in water with the assistance of agitation, at whatever part of the water it is introduced, it will be equally diffused through the whole liquid. Now, though

it were true that a greater quantity of salt should have been introduced into the sea under the line, than towards the poles, from the constant agitation occasioned by the wines and tide, the salt must have soon pervaded the whole mass of water. Neither is this greater proportion of saltness owing to a superior degree of heat, since it is an astablished principle in chemistry, that cold water and hot water dissolve nearly the same proportion of salt.

The saltness of the sea has also been ascribed to the solution of subterraneous mines of salt, that are supposed to abound in the bottom of the sea, and along its shores. But this hypothesis cannot be supported. If the sea were constantly dissolving salt, it would soon become saturated: for it cannot be said that it is deprived of any portion of its salt by evaporation, since rain water is fresh. If the sea were to become saturated, neither fishes nor vegetables could live in it. It may hence be inferred that the saltness of the sea cannot be accounted for by secondary causes, and that it has been salt since the beginning of time. It is, indeed impossible to suppose that the waters of the sea were at any time fresh since the formation of fishes and sea plants; neither will they live in water which is fresh. It may hence be concluded that the saltness of the sea has, with some few exceptions, perhaps arising from mines of rock-salt dispersed near its shores, been nearly the same in all ages. This hypothesis, which is the simplest, and is involved in the fewest difficulties, best explains the various phenomena dependent on the saltness of the sea.

Although this saline property may be one of the causes by which the waters of the sea are preserved from putridity, still it cannot be considered as the principal cause. The ocean has, like rivers, its currents, by which its contents are circulated round the globe; and these may be said to be the great agents which keep it sweet and wholesome. A very enlightened navigator, Sir John Hawkins, speaks of a calm in which the sea, having continued for some time without motion, assumed a very formidable aspect. "Were it, not," he observes, "for the moving of the sea, by the force of winds, tides, and currents, it would corrupt all the world. The experiment of this I I saw in the year 1590, lying with a fleet about the Islands of Azores, almost six months, the greater part of which

time we were becalmed. Upon which all the sea became so repleaished with various sorts of gellies, and forms of serpents, adders, and snakes, as seemed wonderful; some green, some black, some yellow, some white, some of divers colours, and many of them had life; and some there were a yard and a half, and two yards long; which, had I not seen, I could hardly have believed. And hereof are witnesses all the companies of the ships which were then present; so that hardly a man could draw a bucket of water clear of some corruption. In which voyage, toward the end thereof, many of every ship fell sick, and began to die apace. But the speedy passage into our country, was a remedy to the crazed, and a preservative to those who were not touched."

CONGELATION OF SEA WATER.

ALTHOUGH the assertion that salt water never freezes has been contradicted by repeated experience, it is still certain that it requires a much greater degree of cold to produce its congelations than fresh water. It is, therefore, one of the greatest blessings which we derive from this element, that when we find all the stores of nature locked up to us on the land, the sea is, with a few exceptions, ever open to our necessities. It is well known that at particular seasons, the mouth of the river St. Lawrence, the entrance into the Baltic Sca, &c. are so much frozen over as to be impassible by ships: while the vast mountains and fields of ice in the polar regions have for ages past, been insurmountable obstructions to the daring researches of modern navigators. These exceptions, however, will appear of comparatively trifling importance to navigation, when the number of ports which are, in almost every region, open at all seasons of the year, are considered; and this facility of intercourse would certainly not have been afforded, if sea water had admitted of as easy a congelation as that of water not impregnated with salt.

On the origin of ice in the frozen seas different opinions have been entertained. The authority of Captain Cook and Lord Mulgrave has been cited by Bishop Watson, to show that good fresh water may be procured from ice found in those seas; but he observes that, notwithstanding the testimonies of these very able navigators, it may still be

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doubted whether the ice from which the water was obtained, had been formed in the sea, and, consequently. whether sea water itself would, when frozen yield fresh He thinks it probable that the ice had either been formed at the mouths of large fresh water rivers, and bad thence, by tides or torrents, been drifted into the sea, or that it had been broken by its own weight, from the immense cliffs of ice and frozen snow, which, in countries where there are few rivers, are found in high latitudes to project a great way into the sea. An early navigator, Fotherbye, in the relation of his voyage toward the South Pole, in 1614, considers snow to be the original cause of the ice found at sea, he himself having observed it to lie an inch thick on the surface; and Captain Cook from his own observations in the South Sea, was disposed to think, that the vast floats of ice he met with in the spring, were formed from the congelation of snow. It is certain that the snow which falls upon the surface of the sea, being in a solid state, and bulk for bulk, lighter than sea water. will not readily combine with it, but may, by a due degree of cold in the atmosphere, be speedily converted into a layer of ice. The upper layer of this first surface of ice being elevated above the surface of the sea, will receive all the fresh water which falls from the atmosphere in the form of snow, sleet, rain, or dew, by the successive congelation of which the largest fields of ice may at length be formed.

It is a matter of little consequence to a navigator, whence the ice which supplies him with fresh water is produced. Leaving, therefore, these hypotheses relative to the formation of ice in Frozen Seas, it should be observed that the question, whether congested sea water will, when thawed, yield fresh water, has been satisfactorily decided by experiments made with every suitable attention. A quantity of sea water having been taken up off the North Foreland, was exposed to a freezing atmosphere, and afforded an ice perfectly free from any taste of salt; and it has likewise been found, that not only sea water, but water containing double the proportion of salt commonly found in our sea water, and more than is contained in the sea water of any climate, may be frozen by the cold prevails

ing in our atmosphere.

ICE 1SLANDS.
[See Plate, No. 37.]

This name is bestowed by seamen on the huge solid masses of ice which float on the sea near or within the Polar circles. Many of these fluctuating islands are met with on the coasts of Spitzbergen, to the great danger of the vessels employed in the Greenland fishery. In the midst of these tremendous masses, navigators have been arrested and frozen to death. In this manner the brave Sir Hugh Willoughby perished with all his crew in 1553; and in the year 1773, Lord Mulgrave, after every effort which the most accomplished seaman could make, to reach the termination of his voyage, was caught in the ice, and nearly experienced the same unhappy fate. The scene he describes, divested of the horrors attendant on the eventful expectation of change, was most beautiful and picturesque. Two large ships becalmed in a vast bason, surrounded on all sides by ice islands of various forms; the weather clear; the sun gilding the circumambient ice, which was smooth. low, even, and covered with snow, except where pools of water, on a portion of the surface, shot forth new icy crystals: and the smooth surface of the comparatively small space of sea in which they were hemmed. Such is the picture drawn by our navigator, amid the perils by which he was surrounded.

After fruitless attempts to force their way through the fields of ice, the limits of these became at length so contracted, the ships were immoveably fixed. The smooth extent of surface was soon lost; the pressure of the pieces of ice, by the violence of the swell, caused them to pack: and fragment rose upon fragment, until they were in many places higher than the main-yard. The movements of the ships were tremendous and involuntary, in conjunction with the surrounding ice, actuated by the currents. The water having shoaled to fourteen fathoms, great apprehensions were entertained, as the grounding of the ice, or of the ships, would have been equally fatal: the force of the ice might have crushed them to atoms, or have lifted them out of the water, and have overset them; or, again, have left them suspended on the summits of the pieces of ice at a tremendous height, exposed to the fury of the winds, or to

the risk of being dashed to pieces by the failure of their frozen dock. An attempt was made to cut a passage through the ice; but after a perseverance truly worthy of Britons, it proved ineffectual. The commander, who was at all times master of himself, directed the boats to be made ready to be hauled over the ice, till they should reach navigable water, proposing in them to make the voyage to England; but after they had thus been drawn over the ice, for three progressive days, a wind having sprung up, the ice separated sufficiently to yield to the pressure of the ships in full sail. After having laboured against the resisting fields of ice, they at length reached the harbour of

Smeeringberg, at the west end of Spitzbergen.

The vast islands of floating ice which abound in the high southern latitudes, are a proof that they are visited by a much severer degree of cold than equal latitudes towards the north pole. Captain Cook, in his second voyage, fell in with one of these islands in latitude 50° 40' south. was about fifty feet high, and half a mile in circuit, being flat on the top, while its sides, against which the sea broke exceedingly high, rose in a perpendicular direction. the afternoon of the same day, the 10th of December, 1773, he fell in with another large cubical mass of ice, about two thousand feet in length, four hundred feet in breadth, and in height two hundred feet. Mr. Foster, the naturalist of the voyage, remarks that, according to the experiments of Boyle and Marian, the volume of ice is to that of sea water as 10 to 9: consequently by the known rules of hydrostatics, the volume of ice which rises above the surface of the water, is to that which sinks below it as 1 to 9. sing, therefore, this mass of ice to have been of a regular figure, its depth under water must have been 1800 feet, and its whole height 2000 feet: estimating its length, as above, at 2000 feet, and its breadth at 400 feet, the entire mass must have contained 1600 millions of cubic feet of ice.

Two days after, several other ice-islands were seen, some of them nearly two miles in circuit, and 600 feet high; and yet such was the force of the waves, that the sea broke quite over them. They exhibited for a few moments a view very pleasing to the eye; but a sense of danger soon filled the mind with horror: for had the ship struck against the weather side of one of these islands, when the sea ran

bigh, she must in an instant have been dashed to pieces. The route to the southward was afterwards impeded by an immense field of low ice, the termination of which could not be seen, either to the east, west, or south. In different parts of this field were islands, or hills of ice, like those which had before been found floating in the sea.

At length these ice-islands became as familiar to those on board as the clouds and the sea. Whenever a strong reflection of white was seen on the skirts of the sky, near the horizon, then ice was sure to be encountered; notwithstanding which, that substance itself was not entirely white, but often tinged, especially near the surface of the. sea, with a most beautiful sapphirine, or rather berrylline blue, evidently reflected from the water. This blue colour sometimes appeared twenty or thirty feet above the surface, and was propably produced by particles of sea water which had been dashed against the mass in tempestnous weather, and had penetrated into its interstices. In the evening, the sun setting just behind one of these masses, tinged its edges with gold, and reflected on the entire mass a beautiful suffusion of purple. In the larger masses were frequently observed shades or casts of white, lying above each other in strata, sometimes of six inches, and at other times of a foot in height. This appearance seemed to confirm the opinion entertained relative to the increase and accumulation of such huge masses of ice, by heavy talls of snow at different intervals: for snow being of various kinds, small-grained, large-grained, in light feathery locks, &c.; the various degrees of its compactness may account for the different colours of the strata.

In his third attempt to proceed southward, in January, 1774, Captain Cook was led, by the mildest sun-shine which was, perhaps, ever experienced in the frigid zone, to entertain hopes of penetrating as far towards the south pole as other navigators have done towards the north pole; but on the 26th of that month, at four in the morning, his officers discovered a solid ice-field of immense extent, before them, hearing from east to west. A bed of fragments floated around this field, which was raised several feet above the surface of the water. While in this situation, the southern part of the horizon was illuminated by the rays of light reflected from the ice, to a considerable heighs.

Ninety-seven ice-islands were distinctly seen within the field, besides those on the outside; many of them very large, and looking like a ridge of mountains, rising one above the other until they were lost in the clouds. The most elevated and most ragged of these ice-islands were surmounted by peaks, and were from two to three hundred feet in height, with perpendicular cliffs or sides astonishing to behold. The largest of them terminated in a peak not unlike the cupola of St. Paul's.

The outer, or northern edge, of this immense field of ice, was composed of loose or broken ice closely packed together, so that it was not possible to find any entrance. Such mountains of ice, Captain Cook was persuaded, were never seen in the Greenland seas, so that not any comparison could be drawn; and it was the opinion of most of the persons on board, that this ice extended quite to the pole, to which they were then within less than nineteen degrees; or, perhaps, joined to some land to which it had been fixed from the earliest time. Our navigator was of opinion that it is to the south of this parallel that all the ice is formed, which is found scattered up and down to the northward, and afterward broken off by gales of wind, or other causes, and brought forward by the currents which are always found to set in that direction in high latitudes. "Should there," he observes, "be land to the south behind this ice, it can afford no better retreat for birds, or any other animals, than the ice itself, with which it must be wholly covered. I, who was ambitious, not only to go farther than any one had been before, but as far as it was possible for man to go, was not sorry at meeting with this inferruption; as it in some measure relieved us, or at least shortened the dangers and hardships inseparable from the navigation of the southern polar regions."

The approximation of several fields of ice of different magnitudes produces a very singular phenomenon. The smaller of these masses are forced out of the water, and thrown on the larger ones, until at length an aggregate is formed of a tremendous height. These accumulated bodies of ice float in the sea like so many rugged mountains, and are continually increased in height by the freezing of the spray of the sea, and the melting of the snow which calls on them. While their growth is thus augmented,

the smaller fields, of a less elevation, are the meadows of the seals, on which these animals at times frolic by hundreds.

The collisions of great fields of ice, in high latitudes, is often attended by a noise, which, for a time, takes away the sense of hearing any thing beside; and that of the smaller fields with a grinding of unspeakable horror. The water which dashes against the mountainous ice, freezes into an infinite variety of forms, and presents to the admiring view of the voyager ideal towns, streets, churches, steeples, and almost every form which imagination can picture to itself.

ICEBERGS.

Analogous to the ice-fields described above, are those large bodies of ice, named Icesenos, which fill the vallies between the high mountains in northern latitudes. Among the most remarkable are those of the east coast of Spitzbergen. They are seven in number, and lie at considerable distances from each other, extending through tracts unknown, in a region totally inaccessible in the internal parts. The most distant of them exhibits over the sea a front three hundred feet in height, emulating the colour of the emerald: cataracts of melted snow fall down in various parts; and black spiral mountains, streaked with white, bound the sides, rising crag above crag, as far as the eye can reach in the back-ground. At times immense fragments break off, and precipitate themselves into the water with a most alarming dashing. A portion of this vivid green substance was seen by Lord Mulgrave, in the voyage above referred to, to fall into the sea; and, notwithstanding it grounded in twenty-four fathoms water, it spired above the surface fifty feet. Similar icebergs are frequent in all the arctic regions; and to their lapse is owing the solid mountainous ice which infests those seas.

The frost sports wonderfully with these icebergs, and gives them majestic, as well as other most singular forms. Masses have been seen to assume the shape of a gothic church, with arches windows and doors, and all the rich drapery of that style of architecture, composed of what the writer of an Arabian tale would scarcely have ventured to introduce among the marvellous suggestions of his fancy-crystals of the richest sapphirine blue. Tables with one or

more feet; and often immense flat-roofed temples, like those of Luxor on the bank of the Nile, supported by round transparent columns of cerulean hue, float by the astonished spectator. These icebergs are the creation of ages, and acquire annually additional height by falls of snow and rain, which latter often freezes instantly, and more than repairs the loss occasioned by the influence of the sun's heat.

LUMINOUS POINTS IN THE SRA.

Among the phenomena which have long exercised the sagacity of philosophers, that of the luminous appearance of the surface of the sea, during the obscurity of the night, is highly curious. A variety of experiments were made by a French naturalist at Cayenne, at different seasons, to ascertain its true cause; and to him it appeared that these luminous points were produced by motion and friction alone, as he could not, with the help of the best glasses, perceive any insects floating in the water. But it would seem, from the experiments and observations of many learned men, that this phenomenon is produced by various causes, both jointly and separately. It has been proved by one set of experiments, that the putrefaction of animal substances produces light and scintillation in the sea. A little white fish placed in sea-water rendered it luminous in the space of twenty-eight hours. On another hand, it is certain that there is in the sea a prodigious quantity of shining insects or animalcules, which contribute to this phenomenon. A French astronomer, M. Dangelet, who returned from Terra Australis in 1774, brought with him several kinds of worms which shine in water, when it is set in motion; and M. Rigaud affirms, that the luminous surface of the sea, from Brest to the Antilles, contains an immense quantity of little, round, shiring polypi, of about a quarter of a line in diameter. Other learned men, who acknowledge the existence of these luminous animals, cannot, however, be persuaded to consider them as the cause of all that light and scintillation which appear on the surface of the ocean. They imagine that some substance of a phosphoric nature, arising from putrefaction, must be admitted as one of the causes of this phenomenon. other naturalists it has been ascribed to the oily and greasy substances with which the sea is impregnated; in proof of which a kind of fish, resembling the tunny, is cited, as being provided with an oil which shines with considerable lustre.

The Abbe Nolleswas convinced, by a series of experiments, that this phenomena is caused by small animals, either by their luminous aspect, or by some liquor or effluvium which they emit. He did not, however, exclude other causes; and among these, the spawn or fry of fishes is deserving of attention. M. Dangelet, in sailing into the bay of Antongil, in the island of Madagascar, observed a prodigious quantity of fry, which covered the surface of the sea for the extent of more than a mile, and which he, at first, on account of its colour, mistook for a bank of sand. This immense accumulation of spawn or fry exhaled a disagreeable odour; and it should be remarked that the sea, had, for some days before, appeared with uncommon splendour. The same accurate observer, perceiving the sea remarkably luminous in the road of the Cape of Good Hope, during a perfect calm, remarked that the oars of the canoes produced a whitish and pearly kind of lustre: when he took in his hand the water, which contained phosphorus, he discerned in it, for some minutes, globules of light as large as the heads of pins. On pressing these globules, they appeared to his touch like a soft and thin pulp; and some days after the sea was covered with entire banks of small nshes, in innumerable multitudes.

From all these facts it may be deduced, that various causes contribute to the light and scintillation of the sea; and that the light which the Cayenne naturalist attributed to agitation and friction, differs from that which is extended far and near, seeming to cover the whole surface of the ocean, and producing a very beautiful and striking appearance, particularly in the torrid zone, and in the summer season.

TIDES AND CURRENTS.

Alternate tides in sacred order run.

BLACKMORE.

AMONG the most wonderful phenomena of nature may be reckoned the tides of the sea. They were but little understood by the ancients, although Pliny, Ptolemy, and Macrobius, were of opinion that they were influenced by the sun and moon. The former expressly says, that the

cause of the ebb and flow is in the sun, which attracts the waters of the ocean; and he adds, that the waters rise in proportion to the proximity of the moon to the earth.

The phenomena of the tides have been ascribed to the principle of innate gravitation; but Sir Richard Phillips, in his theory of the System of the Universe, refers them to that general law of motion which he considers as the primary and proximate cause of all phenomena, operating, in a descending series, from the rotation of the sun round the fulcrum of the solar system, to the fall of an apple to the earth. This motion being transferred through all nature from its source, serves as the efficient cause of every apecies of vitality, of every organic arrangement, and of all those accidents of body heretofore ascribed to attraction.

The waters of the ocean are observed to flow and fise twice a day, in which motion, or flux, which in the same direction lasts nearly six hours, the sea gradually swells, and, entering the mouths of rivers, drives back the river waters towards their head. After a continued flux of six hours, it seems to repose for a quarter of an hour, and then begins to ebb, or retire back, for six hours more; in which time, by the subsidence of the waters, the rivers resume their usual course. After a quarter of an hour, the

sea again flows and rises as before.

According to the theory of Newton, these phenomena were supposed to be produced by an imaginary power called ATTRACTION. The moon was supposed to attract the waters by the hocus-pocus of an occult power inherent in all matter; just as the earth was supposed to attract the moon, the moon the earth, and the planets one another.-This might be very good philosophy as long as names were admitted as efficient causes; but the more inquisitive spirit of modern philosophy asks how any attraction, or operative force of the nature of attraction, can exist between bodies necessarily separated, according to the same theory, by a vacuum in space, and prevented from falling together by the further necessary hypothesis of a projectile force. Besides, in the phenomena of the tides, it was unfortunate for this gravitating theory, that the tides rise on the opposite sides of the earth at the same time.

The entire theory of all occult attraction and repulsion is, however, visionary and fabulous, and must yield, before

the right of comming an she was thrown, which movines if phenomenous of mather to expension medians, or in the some or of the motions of prestor incless to emiliar move. Prime, ill maintain which we attraced on the outto, he the taken of the waters with atmosphere. The inhigh tenths, he primarile of waters and atmosphere, the inhigh tenths, he primarile of water and mather the transphene of movements, by the binders the maintains on manufact, he takes the country of the careful measured to sate to every average and brown, and mountain the sate to every average and brown, and mountain the sate to every average and

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The common and physical of the title, abunding to the mew ayarm of Phillips, may be described in the walkings proceedings.

1. The tides are simple and palpable phenomena of

motion, and all motion is caused by other motion.

2. If the earth were a true homogeneous sphere, covered equally with water, and moved or turned by forces acting equally on the ends of its equatorial axis, then all its parts would move simultaneously with equal momenta, and there could be no Tides. But if any inequalities in the density of its masses, or any variation in the direction of the forces caused the centre of gyration to become different from the mathematical centre, then the moveable waters, in their capability of accommodating themselves to the centre of gyration, would constantly change their position in relation to the fixed masses.

3. The earth and moon move round a common centre or fulcrum, the arms or distances being in the inverse duplicate ratio of their quantities of matter; and the mundame sluids, in respecting this centre of motion, rise towards the fulcrum, which is always in the line joining the centres of the earth and moon; and hence the phenomena of the Tides, governed in successive rotations by the times in which the common fulcrum, passes the meridian.

4. The tides therefore are caused by the revolution of the earth round the fulcrum, or centre of the momentum of the earth and moon, and as the moveable waters, in restoring the equilibrium, accumulate opposite that fulcrum, they have the appearance of being attracted, as it is called, by the moon.

5. The double tide in every twenty-four hours is caused by the departure of the fulcrum from the sea over the continents which separate the two great oceans from each other, when as no force retains the elevated waters, they re-

lapse or swing back, and produce a second tide.

6. The variable heights of the tides, as apparently connected with the age of the moon, are caused by the variable distance of the body of the earth from the line of its orbicular force, during its revolution round the lunar and mundane centre of motion.

On account of the shallowness of some seas, and the narrowness of the straits in others, there arises a great diversity in the phenomena, only to be accounted for by an exact knowledge of the place. For instance, in the English channel, and the German ocean, the tide is

this of to their executives in three plans, that are it, every the open quantity of water living, in this case, alreed through a similar passage. It is often every through a similar passage. It is often every the name of the passage through containing the majority and with grown trace, and considerably entered, by the rejudity advice these part of the meant [hypergip which it came.

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become the next found from in Lindard.

One of the meaning known tides is that of the Bradial Channel, which constitutes there appeared of fore, thus, &I the mouth of the recording the matter two thirty for. The thire are close constraintly high on the constant Makey, is the versional Sunday at the Real Sun, a through at the record it. Laurence, about the constant of the most began, as Phinones, and in the golf of therefore and terminable tides, involved of the at the first of attended to the constant of the article of the first of a transfer of the and fines and first of the constant of the part of the

Newton, with peculiar sagacity, ascertained to arise from the concurrence of two tides, one from the South Sea, and the other from the Indian Ocean. Of each of these two tides there come successively two every day; two at one time greater, and two at another which are less. The time between the arrival of the two greater was considered by him as high tide; that between the two less, as ebb. In short, with these simple facts in his possession, that great mathematician solved every appearance, and so established his

theory as to silence every opposer.

Besides the common and periodical tides, a variety of LOCAL CURRENTS are met with in different seas, on different parts of the ocean, and for the greater part at an inconsiderable distance from land. They have been usually ascribed to particular winds; but their origin is not easy to trace, as they have been occasionally found beneath the surface of the water running in a contrary direction to the stratum above, and cannot, therefore, have been owing to winds or monsoons. These particular currents have been ascribed to the immense masses of polar ice, which preduce a greater degree of cold in the under than in the upper stratum of waters; and it has been suspected that there is an under current of cold water flowing perpetually from the poles towards the equator, even where the water above flows towards the poles. The great inferiority of temperature which is frequently found in deep and superficial soundings of the same space of water is thus accounted for.

The most extraordinary current is that of the gulf of Florida, usually called the GULFH-STREAM, which sets along the coast of North America to the northward and eastward, and flows with an uninterrupted rapidity. It is ascribed to the Trade winds, which, blowing from the eastern quarter into the great Mexican gulf, cause there an accumulation above the common level of the sea. The water, therefore, constantly runs out by the channel where it finds least resistance, that is, through the gulf of Florida, with such force as to continue a distinct stream to a very great distance. A proof of its having thus originated is, that the water in the gulf-stream has been found to have retained a great portion of the heat it had acquired in the torrid zone.

A very singular upper current often prevails to the west-

ward of Scilly, and is highly dangerous to ships which ap-

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proach the British Channel. Currents of this description. are, however, more frequently met with about the straits of Gibraltar, and near the West India islands, the coasts of which are so subject to counter-tides, or extraordinary currents, that is is often dangerous for boats to land. They proceed to the westward, along the coasts of Jucatan and Mexico, and, running round into the gulf, return into the great ocean, by the straits of Bahama, along the coasts of Florida, in order to pursue, in the north, the course ordained them by the great author of nature. In this course the waters run with an extraordinary rapidity, passing between the great and small American islands in the great deeps, by an almost even and imperceptible motion. Against the shores and coasts of these islands, which form an archinelago, they are, however, very sensible and dangerous, interrupting the navigation, and rendering it scarcely possible to stem them in proceeding to the eastward.

Besides these regular currents, there are others, called COUNTEN-TIDES, which are observable on the sea coasts and shores. In places where these flow, the sea rises in an extraordisary manner, becoming very furious without any apparent cause, and without being moved by any wind. The waves rise and open very high, breaking on the shore with such violence, that it is impossible for vessels to land. These counter-tides are chiefly ascribed to the pressure of the heavy black clouds which are occasion-

ally seen to hang over an island, or over the sea.

PRINCIPAL RIVERS.

Tell by what paths, what subterraneous ways, Back to the fountain's head the sea conveys
The refluent rivers, and the land repays?
Tell what superior, what controlling cause, Makes waters, in contempt of nature's laws, Climb up, and gain the aspiring mountain height, Swift and forgetful of their native weight?
What happy works, what engines underground, Which must with everlasting labour play, Back to their springs the rivers to convey, And keep their correspondence with the sea? BLACKMORE.

Now to mention the great variety of known benefits a ziver bestows on the country through which it flows, its

winding course becomes a delightful ornament, and renders the most beautiful landscape still more exquisitely enchanting. At its fountain head it is nothing more than a small vein of water, oozing from a hill on a bed of sand or clay, on which account it has been supposed to originate in waters brought from the sea by subterraneous ducts, and having lost their saltness by percolation in their passage through the earth. If this be conceded, it is not so easy to explain by what power the water rises above the level of the sea to the summits of mountains, where springs generally abound; it being contrary to the laws of hydrostatics that a fluid should rise in a tube above the level of its surface. Doctor Halley has on this subject ventured an hynothesis which has been most generally received. He attributes the origin of springs to vapours raised by the action of the sun, as well as by the agitation of the winds, from seas, lakes, &c. He made several experiments to show that vapour is a sufficient fund to supply all our rivers, springs, &c. To find the quantity of water which the Meditterranean receives, he allows the most considerable rivers which run into it, such as the Iber, Rhone, Tyber, Po. Danube, Neister, Boristhenes, Tanais, and Nile, each to furnish ten times as much water as the Thampas, including in this estimate the water which flows into that sea from the small rivulets. Now the Thames is found by calculation to evacuate two hundred and three millions of tons of water daily. The above nine rivers, will, therefore, evacuate little more than eighteen millions of tons in a day: and this scarcely exceeds a third of what he had, by preceding experiments, demonstrated to be raised in that time in the form of vapour. He has thus discovered a source abundantly sufficient for the supply of fountains.

To explain this theory on the principles of evaporation, the Doctor considers that if an atom of water were to be expanded into a bubble, so as to be ten times as large in diameter as when it was in its condensed state of water, that atom would become specifically lighter than the air, and would, therefore, rise so long as the warmth which first separated it from the surface of the water should continue to distend it in the same degree; and, consequently, that vapours may be raised from the sea in that manner, till they arrive at a certain height in the atmosphere, in

which they find air of equal specific gravity with themselves. Here they will float, till, being condensed by cold, they become specifically heavier than the air, and fall down in dew; or, being driven by the winds against the sides of mountains, many of which far exceed the usual height to which vapours would of themselves ascend, are compelled by the stream of air to mount up with it to their summits. Being there condensed into water, they presently precipitate, and, oozing down by the crannies of the stones, enter in part the crevices of the hills. These being once filled, all the overplus of water which comes thither, runs over by the lowest place, and breaking out by the sides of the hills, forms single springs. Many of these running down by the vallies, between the ridges of the hills, and uniting, form little rivulets or brooks. Many of these again meeting in one common valley, and, by gaining the plain ground, having grown less rapid, become a river; and many of these uniting, form such prodigious streams of water as the Wolga, the Danube, and the Rhone.

Thus, one part of the vapours, which is blown on the land is returned, by the rivers, to the sea whence it came. Another part falls into the sea before it can reach the land, which is the reason why the rivers do not return so much water into the Meditterranean as is raised by vapour. A third part falls on the low ground, and furnishes the pabulum, or nutriment of plants. But the circulation does not end even here; for it is again exhaled into vapour by the action of the sun, and returned to the great world of wa-

ters whence it first arose.

To this theory, beautiful as it appears, it has been objected that it does not account for the origin of hot and salt springs, and that many springs, among which is a remarkable one at Upminster, in Essex, are not only perpetual, but yield the same quantity of water, whatever proportion of rain or vapour may be afforded. Amid these uncertainties, the exclamation of the apostle Paul may be aptly cited: "O the depth of the riches both of the wisdom and knowledge of God! How unsearchable are his judgmente, and his ways past finding out?

AMERICAN RIVERS.

Not less thy world, Columbus, drinks refresh'd The lavish moisture of the melting year. Wide o'er his isles, the branching Oronoque Rolls a brown deluge; and the native drives To dwell aloft on life-sufficing trees, At once his dome, his robe, his food, and arms. Swell'd by a thousand streams, impetuous hurl'd From all the roaring Andes, huge descends The mighty Orellana. Scarce the muse Dares stretch her wing o'er the enormous mass Of rushing waters; scarce she dares attempt The sea-like Plata-to whose dread expanse, Continuous depth, and wond'rous length of course, Our floods are rills. With unabated force, In silent dignity they sweep along, And traverse realms unknown, and blooming wilds, And fruitful deserts, worlds of solitude, Where the sun shines, and seasons teem in vain, Unseen and unenjoy'd. PHOMPSON.

RIVER OF THE AMAZONS.

This prince of rivers, as it is emphatically styled by Ulloa, is likewise called the Maranon, and was first navigated by Francisco Orellana, shortly after the discovery of Peru, on which account it has occasionally received the masne of Orellana. As it is the largest of all known rivers, so it has its source among the Andes mountains, which. with the exception of a portion of the great Himalaya chain of Asiatic mountains, recently discovered, have the greatest elevation. It forms the northern boundary of Brazil, taking its rise at an inconsiderable distance from the Pacific Ocean, and flowing in an eastern course more than twelve hundred leagues, in which progress it receives upwards of sixty considerable flvers. In some parts it divides into several branches, racompassing a multitude of islands, and at length discharges itself into the Atlantic Ocean, directly under the equatorial line, by a channel one hundred and fifty miles in breadth.

As, among the great number of roots by which nourishment is conveyed to a stately tree, it is difficult, from the length of some, and the magnitude of others, to determine operatedly limit from which the questing to deployed; on him in mind periodically uncorrect in the revening the special of this communication. All the processes of Perry may be add to mountain such other in mounting forth appalers for its incoming forth appalers for the incoming forther the incoming forth and the Analess ungenerated by the ones and ice, paintotakens of forther all search when it is forther executed the transfer of the trains of a first ones.

The common his which this river is no wound are so my. morning, that noting time which have from the control one. dillers, loginaing with the government of Populyon, where the river Camera, or Crown, intringers, to the main spice of thursday, without therey largenes of Line, the conital, page he arrestly one kinest against the manther. For, he is also served, all the vicenma which can weatward from this onon the chain of mountains, without as they advance from their source by the conflux of others, form these maybry circus which afternands unite in that of the Agencone; and, although some traverse a larger distance from that source, still, edines which rise mores, his rowart my in those short course a great mander of howers, and by some quently that harging a propositionale quantity of warm, may be considered as having an equal shine to be called the principle course. The amburs of the Paracises Merceys, where present empiries on this unknown have foun given in the work emitted "The present state of Peru," regard, Towegree, the Panyale as its tool trank, chare they, among refere remonst removes, that it does not yield to live alone up the quantity of its senters, but, on the content of presents would us the cougher one with a province boundth, and with a superfacing a happed place in the change its course. This will he had explained in treating of the Aguntanav, the manner heavened we the Convoli at its origin.

The Maranas, in event of the Amazona, is one from the form of Laurice-ha, as if the city of Maranas, in the form diction of Toron, in elevant deprets of result leadeds, whence it takes a continuous some oftense to the found the depret through the enemy belonging to that formulation, and, terming insentity of count, flows enemy discount flows and the country of Justice Maranas, flows enemy ordinary the object of the contillect, or chain, or have been a type the continuous through the continuous transfer to the continuous trans

of Mayabamba and Chacha-poyas, continues its course to the city of Jaen, in the latitude of five degrees, twenty-one minutes. Thence, by a second circuit, it flows towards the east in a continued direction, till at length it falls into the ocean, where its mouth is of such an enormous breadth, that it reaches from the equinoctial to beyond the first degree of north latitude. Its distance from the lake of Lauricocha to Jaen, including its windings, is about two hundred leagues; and that city being thirty degrees to the west of its mouth, gives a further extent of six hundred leagues, which may, including the several circuits and windings, be moderately computed at one thousand. Thus, the whole course of this transcendant river, from Lauricocha to its influx into the ocean, is at least twelve hundred leagues.

THE APURIMAC.

This river has its source in the wild heaths of Condoroma, in the province of Tinta, in sixteen degrees of south fatitude. It flows impetuously to the east towards the Cordillera of Vilcanota, to the distance of three leagues, when, suddenly shifting its course to the west, it divides that Cordillera from the province of Chumbibileas. It now enters the provinces of Aimaraes and Cotabambas, and directs its rapid course to the north-west, leaving to the east the province of Cusco. In passing through that of Abancay, it declines to the north-east, by which direction it forms, from its primitive source, an arc that receives so many torrents on either side, as to prevent it from being longer fordable. Determining its career to the north, two leagues below the bridge of Apurimac, it forces its passage through the lofty territory of the Andes, running between mountains of incredible elevation, by which it is supplied with abundant waters. In thirteen degrees, ten minutes, the river of Cocharcas, or Pampas, which descends from the heights of Huancavelica, flows into it to the west. The Apurimac continues its course, collecting the waters poured down from the mountains of Guanca; and is joined to the east, in twelve degrees, fifteen minutes, by the river Quillambamba, or Vilcamayo. In twelve degrees, six minutes, it is joined to the west by the river of Jauxa, named by the Indians Mantaro; when, taking a bend to the the north-east, in eleven degrees, eighteen minutes, the Perene incorporates itself with its mass of waters. This latter river originating within two leagues of Tarma, divides that city, and receives various streams from the Cordillera of Bombon, and from Pasco.

From the confluence of the Perene to that of the Pachitea, forty capacious rivers empty themselves into the Apurimac. Of the two which are of particular note, the one that flows into it on the eastern side, in ten degrees forty-five minutes, is the Paucartambo; and the other, which disembogues three leagues below, with such an impetuosity as to propel it against the mountains, and to cause it to change its direction to the north-west, is the Beni. The former of these rivers is the celebrated Amarumayu, by which the Ynca Yupanqui entered, in undertaking the conquest of the tribes of Moxas Indians—an enterprise which was afterwards meditated by Alvarez Maldonado. It originates on the heights of Cusco, and enters with a quantity of water greater by the one half than that which the Apurimac contained before its confluence. After this junction, the latter acquires the name of Apo-paru, or Gran-Paro; and continuing its impetuous course in the same direction as before, is augmented, in eight degrees, twenty-six minutes, by the waters of the Pachitea. It now becomes the formidable rival of the river of the Amazons, and receives the name of UCAYALI, by which it is benceforward distinguished. Taking a declination, in its progress, from the north to the north-east, at the western bank, at which it receives the Pachitea, the following rivers pay it tribute: the Aguaitia; the Manoa, or Cuxhiabatay; the Sarayacu; and the Tapichy Cano Pocati, which communicates with the river of the Amazons in front of the town of San Regis, in five degrees. A bay which occupies an extent of terris tory for three leagues, having been formed, it divides into three branches; and finally falls in with the river of the A mazons, in four degrees, forty-five minutes, causing it to change its impetuous course.

THE OROONOKO.

This celebrated river lies in the jurisdiction of Popayan, and falls into the sea by sixteen mouths. It communicates with the river of the Amazons by the Negro, one of the formidable branches (the eastern) of the river Caqueta. Its western branch, named Yupura, disembogues itself into

the river of the Amazons like another Nile, through seven or eight mouths, and these at such a distance from each other, that the intermediate space between the first and the last is not less than a hundred leagues. M. de la Condamine, in the narrative of his voyage, confirms the opinion of the Negro being one of the communications between the Oroonoko and the river of the Amazons, and corroborates his assertion by the following anecdote, related by a iesuit who published a map of these rivers. In the year 1744, a flying camp of Portuguese, posted on the bank of the river Negro, having embarked on it, proceeded until they found themselves near the Spanish missions of Oroonoko, and, meeting with the superior of these missions, returned with him to the flying camp they had quitted, without going one step by land. Here then is a communication by water between the Spanish and Portuguese possessions in South America, placed at so vast a distance, which demonstrates the magnitude and extent of these mighty Tivers.

The Oroonoko, although it fails in comparison with several other rivers of the new world, far surpasses the largest rivers of our hemisphere. It rolls toward the ocean such a vast body of water, and rushes into it with such impetuous force, that when it meets the tide, which on that coast rises to an uncommon height, their collision occasions a swell and agitation of the waves no less surprising than formidable. When Columbus in his third voyage, having taken a more southern course than he had pursued in the former ones, reached the island of Trinidad, the swell occasioned by the waters of this river pouring into the ocean was so great, that his ships were exposed to extreme danger. After having however, long combated the currents and tremendous waves with dubious success, he led his squadron safely through a narrow strait which separates that island from the continent. This strait he called "Bocca del Drago," the Dragon's Mouth. Justly concluding that such a vast body of water must flow through a country of immense extent, and that he was now arrived at that continent it had long been the object of his wishes to discover, he stood to the west, along the coast of those provinces, now known by the names of Paria and Comana.

RIO DE LA PLATA.

This vast river, like those already described, rises among the stupendous mountains on the western side of South America. During its course, which is said to exceed eight hundred leagues, it receives upwards of fifty rivers, and at length discharges itself into the Atlantic ocean by a very extensive mouth, its northern coast being in thirtytive degrees, and its southern in thirty-six degrees, twenty minutes, of south latitude. It was discovered, in 1515, by Don Diaz de Solis, a very skilful Spanish navigator, who had been sent to open a communication with the Moluccas, or Spice Islands, lying to the west. Having entered a river which he called Rio Janeiro, and which has since given a name to the Brazilian capital, he proceeded thence to a spacious bay, which he supposed to be the entrance of a strait communicating with the Indian ocean. On advancing further, however, he found it to be the mouth of this river; and, being auxious to prosecute his discovery, was cut off, with several of his crew, by Being thus disheartened, the survivors rethe natives. turned to Europe, without having made any further attempt to explore the territory.

P. Cataneo, a Modenese jesuit, who landed at Buenos-Ayres in 1749, expresses his astonishment at viewing this vast body of water. "When," he observes, "I resided "in Europe, and read in books of history or geography "that the mouth of the Rio de la Plata was a hundred and " fifty miles in breadth, I considered it as an exaggeration, "because in this hemisphere we have not any example of "such vast rivers. When I approached its mouth, I had "the most vehement desire to ascertain the truth with my "own eyes; and I have found the matter to be exactly as "it was represented. This I deduce particularly from one " circumstance. When we took our departure from "Monte-Video, a fort situated more than a hundred miles "from the mouth of the river, and where its breadth is "considerably diminished, we sailed an entire day before "we discovered the land on the opposite bank of the river; "and when we were in the middle of the channel, we "could not discern land on either side, and saw nothing

"but the sky and water, as if we had been in some great "ocean. Indeed, we should have taken it to be the sea. "if the freshness of its water, which was turbid like that of "the Po, had not satisfied us that it was a river. Moreover, "at Buenos Ayres, another hundred miles up the river, and "where it is still much narrower, it is not only impossible "to discern the opposite coast, which is indeed, very low " and flat, but one cannot perceive the houses, or the tops " of the steeples, in the Portuguese settlement at Colonia, " on the other side of the river."

It has been asserted that most of the rivers of Peru and Chili have scarcely any motion by night, while on the appearance of the morning sun, they resume their former This would appear to proceed from the mountain snows, which, being melted by the powerful heats, increase the stream, and continue to drive on the current, while the sun is engaged in dissolving them. Thus are formed these wonderful masses of water!

In concluding this account of the rivers of South America. the prodigious multitudes and variety of the fishes with which they abound, ought not to be passed over unnoticed.

In the river of the Amazons, agreeable to the testimony of the Jesuit Acugna, they are so abundant, that, without any art they may be readily taken with the hands. "the Oroonoko," observes another Jesuit, Gumilla, beside an infinite variety of other fishes, turtles abound in such "numbers as words cannot be found to express. I doubt "not but that such as read my account will accuse me of "exaggeration: but I can affirm, that it would be as diffi-"cult to count them, as to count the sands on the banks " of that river. Their multitude may be estimated by the " surprising consumption of them; for all the nations con-"tiguous to the river, and even many dwelling at a dis-"tance, flock thither at the breeding season, and not only "find sustenance during that time, but carry off great num-"bers both of the turtles, their eggs, &c."

THE MISSISSIPPI.

PROCEEDING to North America, this vast river claims the principal attention. It runs chiefly from North to South, receiving in its course many large rivers, scarcely inferior to the Rhine or the Danube, navigable almost from their sources, and laying open the inmost recesses of this part of the great American continent. Near the heads of these are extensive lakes, having a communication with each other,

and with the great river St. Lawrence.

The Mississippi is supposed to take its rise from three or four springs which unite at about forty-six degrees of north latitude, and ninety-eight of west longitude. It has been ascended as high as forty-five degrees North, about one hundred and fifty miles above the FALLS OF ST. ANTHONY. Its course extends above two thousand miles, comprising its continual flexions. In a south-east direction, it proceeds till it reaches about thirty-eight degrees of north latitude; and then takes a course almost due south, till it arrives at West Florida, where it again runs to the south-east. On the westward, near the falls of St. Anthony, it receives the river St. Pierre, or St. Peter; and in the same direction, in about forty-one degrees of north latitude, the Moingoffa; receiving from the eastward the Fox river, and the Illinois, below forty degrees. A little lower, the noble Missouri runs into it from the westward, the Ohio joining it from the eastward. At thirty three degrees the White-River and the Paniassas first join, and then pour their united streams into this grand receptacle of waters, which discharges itself into the sea by many openings.

This grand river, after being joined by the Missouri, is about six miles in width, and continues its course southernly, not any considerable stream falling into it, after the above, for between two and three hundred miles, when it is joined by the Ohio. The country on each side the Mississippi to this part is exceedingly fine, and the climate

warm and agrecable.

The navigation of the Mississippi is very tedious, even indescending, as it is not deemed safe to sail down it during the night, the channel being constantly encumbered by thoating trees, which the winds tear from its banks, and precipitate into the water. The ascent is still more difficult and tedious. Proceeding northward from its mouth, the adjacent country is one continued level spot, covered with vast forests, which so entirely intercept the winds as to cause a dead calm constantly to prevail, insomuch that, in this part it usually requires a month to navigate twenty leagues only. When these forests cease, the remainder of

the navigation is obstructed by strong currents, so that boats seldom advance farther than five or six leagues in the course of a day and night. This river bounds Louisiana to the eastward; and at its mouth is the isle of Orleans, a very beautiful and fertile spot. The city of New Orleans. the capital, owed its rise to the delusions which were practised on the French nation by the celebrated projector Law. The immense wealth which was supposed to be contained in the mines of St. Barbe, in Louisiana, caused a company to be formed in France; and the national phrensy, which was long prevalent, led vast numbers to embark. for the purpose of settling on the banks of the Mississippi. Being landed in West Florida, the greater part perished through want; and the survivors were removed to this island, where the city of New Orleans was built for their accommodation.

THE OHIO.

This river rises in several branches, some of which have their source in the vicinity of Lake Erie, and others within a few miles of Lake Ontario. It is also denominated the "Fair river," and is styled by Mr. Jefferson, late President of Congress, "the most beautiful river on earth." Until it is joined by the Monongahela, it is named the Alleghany. the former rising from the west side of the Alleghany mountains, in a great number of small streams, which unite, and, together with the Alleghany, form this river, in forty degrees, thirty-five minutes north latitude. Receiving now the name of the Ohio, its general course afterwards inclines to the south-west, and takes a remarkably winding serpentine form. At Fort Pitt, where the junction is made. it is little more than a mile in width, but becomes much wider before it joins the Mississippi, in latitude thirty-six degrees, eight minutes, north, receiving several streams in its course thither. Between the lakes and this latter junction, the country for several hundred miles has a delightfully variegated scenery, and a rich soil.

This river is not, any more than the Mississippi, acted on by tides, the copious efflux causing the waters constantly to proceed with rapidity toward the mouth, so that ships cannot, without great difficulty, navigate upward. The commercial benefits which these rivers yield are on that

account chiefly internal, a ready conveyance being furnished for the export of the productions of the country, but with an incapacity to bring back foreign produce in return. In the rising state of Kentucky many ships are built, which, floating down the Ohio, proceed to the gulf of Mexico, and, taking the benefit of the current which constantly sets in to the northward, through the straits of Bahama, reach their destined port on the eastern coast of North America, with great safety and celerity. One material impediment. however, to this navigation on the Ohio, is a considerable fall, about the latitude of thirty-eight degrees north. This fall has, however, a gradual descent, which is continued for half a league. There is a considerable variation in the quantity of water which fills the bed of this river at different seasons of the year; and when it becomes shallow, the depth of water at the fall, barely suffices to convey light boats down the stream.

THE SAINT LAURENCE.

THE source of this great Canadian river has never been traced, although it is known to have communication, by the lakes, with the interior of the country, to a vast extent. After a north-eastern course of many hundred miles, it discharges its waters into a large gulf, extending from forty-five degrees, thirty minutes, to fifty-one degrees of north latitude; the islands of Newfoundland and Cape Breton lying between it and the great Atlantic ocean. It is navigable for large ships as high as Quebec, four hundred miles from its mouth; but higher up, the navigation is impeded by rocks and shoals. The difficulties and dangers attendaut on it were greatly exaggerated by the French, while in possession of Canada; but since the latter has become a British colony, the utmost attention has been bestowed to form accurate charts of this river, and to afford every aid to its safe navigation. In executing these designs, the immortal Cook was for some time employed, before he became a circumnavigator; and the abilities he then displayed, laid the foundation of his future fame.

The other North American rivers, however inferior to those already described, and to those of South America, are still on the grand scale by which the face of that continent is so pre-eminently distinguished. On the eastern

side, are the fine rivers Hudson, Delaware, James, Potomac, Susqueranna, Connecticut, and several others of extensive length, and great depth. Those which flow westward, and discharge themselves into the Pacific ocean, are but imperfectly known: the Oregan, likewise called the Columbia, or river of the west, is supposed to be the largest, and, so far as it has been traced, has been found to be of such a breadth and depth, and so rapid, as to lead to a conjecture that it takes its rise in the

central part of the American continent.

The DELAWARE, the largest river in the state of Pennsylvania, rises in the country of the five nations, and flows into the sea at Delaware bay. It is navigable for nearly a hundred and fifty miles, when falls occur. The settlements on this river extend a hundred and fifty miles from the city of Philadelphia, which is seated to the westward, on its bank, and to the eastward on the Schulkill, which the Delaware joins a few miles below Philadelphia. The Susquehanna rises in the same state, at the distance of ninety miles from the Apalachian mountains, and runs at first south-west, and then south-east, nearly parallel to the Delaware, till it discharges itself into Chesapeak bay, in Maryland. This river is likewise navigable to a very great distance in the interior of the country, and, if possible, exceeds the other in the pleasantness and fertility of the soil on its banks. The SCHULKILL, already mentioned, runs parallel to the other two rivers, and is navigable for at least a hundred miles in the interior. These rivers, with the numerous bays and creeks in Delaware bay, which is capable of containing the largest fleets, render this province admirably suited for carrying on a foreign trade.

On the side of Virginia, JAMES RIVER, YORK RIVER, the RAPPAHANOCK, and the POTOMAC, flow into the bay of Chesapeak, which is enriched throughout its whole extent by a vast number of fine navigable rivers. This bay is one of the finest and largest in the known world; for it enters the country nearly three hundred miles from the south to the north, having the eastern side of Maryland, and a part of Virginia, on the same peninsula, to shelter it from the Atlantic ocean. Its breadth for a considerable distance is nearly eighteen miles, and seven where it is.

marrowest.

The above rivers are not only navigable to a very considerable extent, but have so many creeks, and receive such a number of smaller navigable rivers, as to render the communication to all parts of the country inconceivably easy. The Potomac is navigable for nearly two hundred miles, being nine miles in breadth, at its mouth, and not less than seven for a very considerable distance. The other three rivers are navigable upwards of eighty miles; and in their windings approach so near to each other, that the distance between them in some parts is not more than five miles, and in others does not exceed ten.

The Connecticut rises in the state of New Hampshire, in forty-five degrees of latitude, and pursues a remarkably straight course to the south, discharging its waters into the sound opposite Long Island. About one hundred and forty miles from its source, are the rapids, or falls, occasioned by the water being enclosed by two rocks within a space of about thirty feet, and falling into a broad bason beneath. Over these rocks a bridge has been thrown with such an elevation as to be inaccessible to the highest

floods.

HUDSON'S, or the NORTH RIVER, rises within about twenty miles of LAKE GEORGE, and, running to the south, discharges itself at Sandy Hook, the entrance of the river of New York. It is navigable for vessels of a moderate burden as high as Albany, a distance of one hundred and fifty miles.

ASIATIC RIVERS. •

THE GANGES.

Born in magnitude and extent the Ganges is a most noble and majestic river. It rises in the kingdom of Thibet; entering Hindostan about the thirtieth degree of latitude, and runs first south-eastward by the cities of Bekaner, Minapor, Halabes, Benares, and Patna, to Rajah Mahl, where it divides into two branches. The eastern having passed by Dakka, the capital of Bengal, enters the gulf of that name about Chatigan. The western, descending by Kossum-bazar and Hughly, falls into the gulf below Chandernagor towards Pipeli. Many of the Jews, and ancient Christians believed this river to be the Pison, one of the four mentioned in Scripture as the boundaries of the

terrestrial paradise.

The length of the Ganges exceeds fourteen hundred miles. The Burrampooter, its proudest auxiliary, is nearly of the same length; and the opinion generally entertained. is, that the sources of these mighty rivers are not far distant from each other. Each of them runs, however, nearly a thousand miles, before they unite and constitute one common stream, falling into the bay of Bengal by several mouths. Ganga is, in the Hindostan language, a general term for a river; but it is particularly applied to this one on account of its unrivalled magnificence. The Hindoos have a superstitious veneration for all the great rivers which fertilize their country; but the waters of the Ganges are to them peculiarly sacred. In its impetuous course it opens a passage through Mount Himmeleh, and again appears, amidst impending rocks, which resembling, on an immense scale, the head of a cow, an animal equally esteemed by the Hindoos, as was the apis, or sacred ox, among the Egyptians, their religious awe for the Ganges is, on that account, enhanced. Not any river in the world imparts greater benefits to the countries through which it passes; for, by annually overflowing its banks like the Nile, it waters and manures the country to an extent of an hundred miles in breadth. The Hindoos having deified this river, make it an act of their religion to perform a pilgrimage to it, supposing its waters to purify from defilement such as bathe in them. On its slimy shore they bury their dead, and also remove those who are at the point of death to its banks, or to those of some one of the creeks which run into it.

On certain festivals, a concourse of upwards of a hundred thousand persons assemble to bathe in the Ganges, on the banks of which are a great number of superb and immensely rich pagodas. But what principally distinguishes this river, besides its greatness and rapidity, is the gold it brings down in its sands, and throws on its banks; and the precious stones and pearls it produces, not only in itself, but in the Gulf of Bengal, into which it discharges its waters, and which abounds with them. The Chun, or Jemma, the Guderasu, the Persilis, Lakia, and

several other rivers, discharge themselves into it during its course.

THE INDUS.

Thus river is by the natives called Sinde or Sindet, and in the Sancrit language Seendho. It is likewise denominated Nilab, or the blue river. Its source has not been accurately traced; but it is generally supposed to originate in the mountains of Mus Tag, running from east to west, and forming a chain to the south of little Bucharia. Having flowed for an extent of upwards of a thousand miles, it forms a Delta in the province of Sinde, and enters the Indian Sea by numerous mouths.

The tributary streams of the Indus chiefly join it in the northern part of its course, where they form the Panja, or county of five rivers. From the west, the Kamet, with its auxiliary streams, and the Comul, flow into it; from the east, the Bahut, or Hydaspes; the Chunab, or Acesinas; the Kauvee, or Hydraotes; and the Setleg, or Hesudrus. The whole of this part of Hindostan is at present but little known: much is, however, expected from the indefatigable researches of the members of the Asiatic Society. It is even uncertain whether the Caggan, a considerable and distant river to the east, joins the Indus, or falls into the gulf of Cuteh.

Mr. Elphinstone, in his account of the kingdom of Caubul, introduces the following interesting account of the

Indus:-

"We were anxious and happy as we approached the river, and were not a little gratified when at last we found ourselves upon its banks. The Indus, besides its great name, and the interest it excites as the boundary of India, is rendered a noble object by its own extent, and by the lofty hills which form the back-ground of the view.— We were, however, a little disappointed in its appearance, owing to an island, which divided it, and impaired the effect of its stream. There were other islands and sandbanks in the river; but near the side where we stood, it came up to the edge, and seemed deep and rapid. While on the banks of the river, we met a native, to whose conversation, and that of the guide, we listened with great

interest and curiosity. The plains on the opposite shore we found were inhabited by Beloches, and the mountains by the Sheeraunees, a fierce and turbulent tribe. On the other side of the range were tribes and places, of which we had never heard the names; while those we had learned from our maps, were equally new to our informants. All we could learn was, that beyond the hills was something wild, strange, and new, which we might hope one day to explore.

"From Oodoo da Kote, near which we first saw the Indus, to the ferry of Kaheree, where we crossed it, is about seventy-five miles. It is a narrow tract, contested between the river and the desert. If, in hunting, we were led many miles to the west of the road, we got into branches of the river, and troublesome quicksands, among thickets of tamarisk or of reeds; and, if we went as far to the right, the appearance of sand, and even in some places of sand hills, admonished us of the neighbourhood of the desert. Many parts, however, were cultivated with great pains and method, and produced good crops of wheat, barley, turnips, and cotton. The fields were always enclosed, either with hedges of dry thorn, with hurdles of willow, or with fences, made of stiff mats of reeds supported by stakes. Some of the houses near the river attracted our attention, being raised on platforms, supported by strong posts, twelve or fifteen feet high. We were told they were meant to take refuge in during the inundation, when the country for ten or twelvecoss (twenty or twentyfour miles,) from the banks was under water."

Besides the above majestic rivers, those principally descrying of notice in the Asiatic territory are the following.

The EUPHRATES, which has two sources: one of these is about seventy miles from the shores of the Euxine or Black Sea, and, taking a circuitous course of five hundred leagues, first to the south-west, and then to the south-east, discharges itself into the Persian gulf. About a hundred miles to the north-west of Bassora it is joined by the Tigris, which, rising in its vicinity, proceeds in a nearly straight course through Armenia Major, or Turco-mania, until it forms its junction. On this river the ancient city of Ninevah is supposed to have stood. The Kistna, a stream peculiarly sacred, rises at Belisur,

not far to the south of Poonah, and is equally celebrated for the fertility it diffuses, and for the rich diamond mines near which it flows, particularly those of Visiapour and Golconda. The CAVERY passes by Seringapatam, the capital of Mysore, forming an immensely wide Delta, or triangle, and entering the sea after a course of about three hundred miles.

In the enormous extent of the Chinese Empire there are two rivers which are rendered particularly interesting by their great length and majestic breadth. These are the Hoang-ho, or Yellow River, and the Kian-ku.

THE HOANG-HO.

THE sources of this river are two lakes, situated in the chain of the Tartarian mountains, known by the name of Kohonor. They lie in about the thirty-fifth degree of north latitude, and in the nineteenth of longitude, to the westward of Pekin, and in ninety-seven degrees east of Greenwich. This prodigious river is extremely winding, and deviates in its course, pursuing a north-east direction to about the forty-second degree of north latitude; when, after running due east, it suddenly bends south to a latitude nearly parallel to its source, and pursues an easterly direction till it is lost in the Yellow Sea. Its course may be estimated at about one thousand eight hundred British miles, or, according to the embassy of Lord Macartney, two thousand one hundred and fifty. At the distance of about seventy miles from the sea, where it is crossed by the Imperial canal, its breadth is little more than a mile, with the depth of a few feet only; but its velocity is equal to seven or eight miles an hour.

THE KIAN-KU.

Trus river rises in the vicinity of the sources of the Heang-ho, but about two hundred miles further to the west, and winds nearly as far to the south as the latter does to the north. After washing the walls of Nankin, it enters the sea about a hundred miles to the south of the Hoang-ho. Through its long progress, the Kian-ku is known by various names. Its course is nearly equal to that of the other river, these two being considered as nearly if not altogether, the longest on the face of the globe. They

certainly equal, if they do not exceed, the famous river of the Amazons in South America: the majestic course of the Ganges does not exceed half their length. In the narrative of Lord Macartney's embassy, the extent of the Kian-ku is estimated at about two thousand two hundred miles; and it is there observed that these two great Chinese rivers, taking their source from the same mountains, and passing almost close to each other in a particular spot, when they separate to the distance of fifteen degrees of latitude, or about one thousand and fifty British miles, finally discharge themselves into the same sea, comprehending a tract of land of about a thousand miles in length, which they greatly contribute to fertifize.

AFRICAN RIVERS.

THE NILE.

Rich king of floods! o'erflows the swelling Nile.

THOMSON.

This celebrated river is likewise called Abanchi, signifying in the Abyssinian tongue "the father of rivers," and is named by the Africans Neel Shem, the Egyptian river. It divides Egypt into two parts; and its extent, from its source, is supposed to exceed two thousand miles. It arises from amidst the mountains of the moon, in Upper Ethiopia, and flows into the Mediterranean sea by seven channels, two only of which are at present navigable. The ancients were entirely ignorant of the source of this river, although many endeavors were made by them to explore it; but it is now well known to lie in about the twelfth degree of north latitude. It enters the lake of Dambia, in Abyssinia, crossing one of its extremities with such extreme rapidity, that its waters may be distinguished through a progress of six leagues within this lake. Here its magnificence commences: after a further progress of about fifteen miles, it rushes precipitately from the summit of a high rock, forming one of the most beautiful waterfalls known. It now again collects its scattered streams among the rocks, which seem to be disjointed in that part

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merely to afford it a passage. They are so close to each other, that a bridge of beams was once laid over them to afford a passage to an army; and Sultan Segued built over them a bridge of one arch, to construct which he procured masons from India.

The greater part of Lower Egypt is contained in a triangular island, formed by the Mediterranean Sea, and the two great branches of the Nile—which dividing itself five or six miles from Old Cairo, flows on the one side to the north-east, falling into the sea at Damietta; while the other branch runs to the north-west, and enters the sea at Rosetta. What is called the Delta, resembling the Greek letter of that name, and constituting a triangle, is thus formed.

The water of the Nile is thick and muddy, mere particularly when the river is swollen by the heavy rains which constantly fall within the tropics in the beginning of the summer-season, and which are doubtless the principal cause of its overflowing the low lands of Egypt. A similar phenomenon in the Ganges has been noticed above; and it is the same with all the rivers which have either their rise or course within the tropics; they annually break their bounds, and cover the lands for many miles on each side, before they reach the sea. They likewise leave prolific mud, which, like that of the Nile, fertilizes the land; beside which, the north winds prevailing about the latter end of May, drive in the waters from the sea, and keep back those of the river, in such a manner as considerably to assist the swell.

The Egyptians, and the Copts more especially, are persuaded that the Nile always begins to rise on the same day of the year; as, indeed it generally commences on the 18th or 19th of June. Its rise was observed for three successive years by Dr. Pocoke, who found it to ascend during the first five days from five to ten inches; and it thus continued rising till it had attained the height of nine feet, when the canal of Cairo was cut. It then rose from three to five inches only in the day; for, having spread over the land, and entered the canal, although more water might have descended than before, its rise was less considerable. The other canals were now laid open at stated times, and those which water the lower grounds the last. These canals are carried along the highest parts of the coun-

try, to the end that the water may be conveyed to the vallies.

The Nile has one peculiar characteristic. Other rivers being supplied by rivulets, the ground is lowest near their banks; but as not any water flows into the Nile in its passage throughout Egypt, and as it is necessary that this river should overflow the land, the country is generally lower at a distance from, than near to it; and, in most parts, the land has a gradual descent from the river to the foot of the hills, which terminate the sandy plains most benefitted by

the irrigation.

Among other remarkable appearances, the celebrated Bruce notices a very singular one attendant on the inundation of the Nile. In Abyssinia, the early part of the morning is constantly clear in that season, with a fine sunshine. About nine, a small cloud, not above four feet in apparent breadth, appears in the east, whirling violently round as if on an axis; but having approached nearly to the zenith, it first abates its motion, and then loses its form, extending itself greatly, and seeming to call up vapours from all the opposite quarters. The clouds thus formed having attained nearly the same height, rush against each other with great violence, and remind the spectator of Elisha foretelling rain on Mount 'Carmel. The air being impelled before the heaviest mass, or swiftest mover, makes an impression of its form on the collection of clouds opposite; and the moment it has taken possession of the space made to receive it, the most violent thunder possible to be conceived follows. instantly, attended by rain. After some hours the sky again clears, with a wind at north; and it is always disagreeably cold when the thermometer is below sixty-three degrees.

Dr. Clarke, in his travels, draws the following elegant

picture of this most interesting river.

"Here we were unexpectedly greated with an astonishing view of the Nile, the Delta, and the numerous groves in the neighbourhood of Rosetta. The scene is beyond description. The sudden contrast it offers, opposed to the desert we had traversed, the display of riches and abundance poured forth by the fertility of this African paradise, with all the local circumstances of reflection excited by an extensive prospect of the Nile, and of the plains of Egypt, render it one of the most interesting sights in the world.

The beautiful boats peculiar to the Nile, with their large wide-spreading sails, were passing up and down the river. Unable to quit the spot, we dismissed our guides, and remained some time contemplating the delightful picture. Afterwards, descending on foot, close by the superb mosque of Abu-mandur, we continued our walk along the banks of the Nile, through gardens richer than imagination can pourtray, beneath the shade of enormous overhanging branches of sycamore and fig trees, amidst bowers of roses, and through groves of date, citron, lime, and banana trees, to Rosetta.

THE SENEGAL.

NEXT to the Nile, this is the most remarkable river in Africa. It takes its rise from the western declivity of the mountains of Govina, or Caiphas, in fourteen degrees of north latitude, and nearly on the meridian of Greenwich. From the eastern declivity of these mountains the Niger takes it rise, and may, therefore, be comprehended in this description. The Africans navigate both these rivers; and, where the cataracts occur in the former, carry their goods. by land. A trade is carried on by small vessels as high as the first cataract of the Senegal, two hundred and eighty leagues from its mouth, at which it is extremely rapid. owing to an immense body of water being confined within the small breadth of half a league. There is also at the entrance a bar, which renders the passage very difficult and dangerous, especially in the rainy season, when the prodigious swell of the river, and the south-west winds, being opposed to its rapid course, raise waves of so prodigious a height at the bar, that their clashing resembles the shock of mountains, and they are said to be so furious as occasionally to dash in pieces the stoutest ships. Having crossed the bar, a smooth and gently-gliding river is entered, four fathoms in depth. It takes a western course, tending somewhat to the northward, through sixteen degrees of longitude; and, including its bendings, extends upwards of eleven hundred miles.

The Senegal has been supposed to be a continuation of the Niger; but it is now thought that the latter discharges its rapid stream into a lake not more than sixty miles distant from another lake of great depth, called Maberia, whence

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my vessel by a ridge of very high mountains.

The saw rivers inve, the the Nile, their ages the a country and the whole of the flat country and America They began and come much about the same times on the on conform; but the calutary effects organizations un-Payer are not to be found here; for, instead of Installant bruty, discover, famine, and death, follow to those trans. indidence of the savage wanderers who occupy etc banks, continue to any agricultural purpose; and the commany tying natified, produces from its luxuriance great almostoness of mut and notions herbage, furnishing a convenient repostrony for venomious insects and reptiles, as used as for beauts of prey. When the waters of these rivers retire onto their channels, the honiday and host which prevail spread a postileutial taint; while the careaces of ourst mutobees of attinuels, swept away by the insudation, become powid, and spread around a loathsume and baneful atench .-Even the regetation itself is charged with shearmantaon; for among the plants which grow on the banks of the Someonly, some diffuse an insufferable and deleterious oderar.

THE GAMESA.

This river lies to the south of the Senegal, and flows in mustly the same direction. It has a very extensive, with, and reput course, and discharges itself into the Atlantic in the senegal course and the charges in the senegal course in the senegal course.

CUROPEAN DIVERS.

THE VILLES

Is surelying the grand and henefland anomobility of reeas disposed over the construct of Europe, the Volgospoents upon a the most extraction in the course, better of district theorem in the meth. However, the construction of the women's of Ramad, it wasters that is a discrete on a contraction of the contraction of the contraction of the most in the contraction of the contraction of the conplex of vectors channels, before Asserted, and pre-lessing classes in the place when it is a property of the con-



through Lithuania, Little Russia, the country of the Zaporo Cossacks, and a tract inhabited by the Nagaian Tartars. After forming a lake thirty-four miles in length, and in many places from two to six in breadth, it discharges itself into the Black Sea. Within the space of thirty-five miles, the Nieper, the banks of which are elevated, has not less than thirteen falls. At Kiew a floating bridge, one thousand six hundred and thirty-eight paces (upwards of a mile and a half) in length, has been thrown over it. This bridge is removed towards the end of September, to admit a passage down the river to the immense masses of floating ice; and is again put together in the spring. One this river a great number of mills have been erected in boats.

THE NEVA.

This river likewise belongs to the vast empire of Russia, and issues from the lake Lagoda, flowing with a rapid course until it discharges itself into the gulf of Finland. A great part of the city of St. Petersburgh is built on islands formed by its branches, and by those of the rivers Fontanca and Moica. It has but one bridge, which is constructed with large flat-bottomed boats, which are laid across the river in the spring, and removed in the autumn, at the setting in of the frost. In this way a safe and convenient passage is formed between the Arsenal and Basili-Ostrow, or Bazil's island. The communication between the other islands is by boats and barks; but bridges are built over the Moica and Fontanca, and likewise over the canals, which are as numerous as at Amsterdam. tersburgh is much exposed to inundations: in September 1777, one rose to a very great height, and did predigious. damage.

THE DWINA.

This is a very considerable river, the name of which implies double, it being formed by the confluence of the Sukona and the Yug. It divides itself into two branches, or channels, near Archangel, whence it runs into the White Sea.

THE DANUBE.

THE next considerable river of Europe, in which quarter it rises and terminates, is the Danube, the ancient Ister. It has its source in Suabia, within a few miles of the borders of Switzerland, in latitude forty-eight degrees north, and nine degrees of east longitude, whence the Rhine also issues, but takes a north-west course, while that of the Danube is eastward. It intersects Bavaria, Austria, and Hungary, inclining to the south at Vaez, a town in the latter kingdom. It divides the bannat of Tamesvar from Servis, and Wallachia from Bulgaria, discharging itself, after a course of nearly fourteen hundred miles, by several channels, into the Euxine or Black Sea, with such violence, that its waters are distinguishable for several miles from those of the sea into which they are precipitated. It is said to receive sixty navigable rivers in its progress, and an equal number of smaller streams. From Buda, in the centre of Hungary, to Belgrade, on the northern confine of Servia, its depth and breadth are so considerable, that in the wars between the Christians and Turks, these powers had fleets on it, and several naval engagements took place. Farther down it is rendered manavigable by its. many cataracts, so that all commerce with the Black Sea, by means of this great river, is rendered impracticable,

THE RHINE.

Or all the countries of Europe, Switzerland is the one in which the greatest number of rivers take their rise. Of these the principal is the Rhine, which has its sources, in the Grison territory; and by these the distinctions of Upper Rhine, Middle Rhine, and Lower Rhine, are determined. The Upper Rhine issues from a small lake on a mountain called the Oberalp. The Middle Rhine has its source in Luckmanier, one of the Adula chain of mountains, and joins the Upper Rhine, after a course of about eighteen miles. The Lower Rhine, rises at a distance of about nine miles, in a mountain, called by the Italians Monte del Uccelo, or Bird's Hill.

At a small distance from the lake of Constance, through which the Rhine flows, a bridge has been thrown over

it at Scaffhausen, which is much admired on account of the beauty and singularity of its architecture. The rapidity of the river having carried away several stone bridges, this one, constructed of wood, and of a single arch, has been so well contrived, as to be perfectly secure. Near

this bridge is a fine water-fall.

Having flowed westward to Basle, it proceeds in a direction due north, along the eastern borders of Alsace, till it receives the Maine, a little below Frankfort, and proceeding thence north-westward, enters the Netherlands. Its course exceeds seven hundred miles; and on its banks the cities of Mentz, Coblentz, Cologne, Dusseldorf, Wesel, and Cleves, are situated. It intersects the circles of the Upper and Lower Rhine. In its course through Alsace it frequently causes dreadful devastations, not only in winter, but in the summer, when the snow melts on the Alps. Its inundations, in devastating the fields, cover them with sand; and the violence of its torrents, which are very frequent, occasionally change the situation of the islands placed within its bed.

One of the singularities of the Rhine is, that particles of gold afe found in the sand which the torrents, in their fall, wash from the Alps, and bring into it.. Hence it is only below Basle that the sand contains this precious metal, which, in autumn and winter, when the river is at the lowest, is drawn out with the sand, and extracted by repeated washings. Its particles are seldom so large as a grain of millet seed; but the gold is very fine and beautiful. It is so scarce, however, that the city of Strasburg, which has the privilege of collecting it for the extent of nearly four miles, scarcely collects five ounces in a year. This river also contains many crystals and particularly pebbles, which take a beautiful polish: these are well known under

the name of Rhine pebbles.

At Utrecht the Rhine divides into two branches, called the Old and New Rhine, both of which cross the city throughout its length. One of these branches loses itself in the sands below Leyden, and the other, assuming the name of the Lech, falls into the Maine. Thus does this grand and important river, after so long and useful a course, terminate obscurely, without pouring its aggregated

waters into the common receptacle, the ocean!

THE RHONE.

This fine river rises in the glacier of Furca, near the canton of Uri, in Switzerland, but in the north-east border of the Valais. It first precipitates itself with great noise from amid several rocks, and, in flowing into the vale beneath, has the appearance of a single cataract, with several cascades. It is afterwards joined by the Meyanwang stream, issuing from the Grimsel mountain, and then directs course from east to west, until, after taking a winding course to the north, it discharges itself with great impetuosity into the lake of Geneva. All the streams and small rivers of the valais, issuing from the mountains, flow into it.

The waters of the Rhone rush into the lake with such rapidity, that for the distance of half a league they continue unmixed with those of the latter; but there is not afterwards any visible distinction, as has been affirmed. At its efflux from the lake it forms an island, on which, and on the banks on either side, the city of Geneva is built, being divided into three unequal parts, having a communication by four bridges. Onward it forms the boundary between France and Savoy. It then takes a western direction, and, dividing the province of Burgundy from that of Dauphine, flows to Lyons, from which city it proceeds due southward, forming the eastern boundary of Languedoc, which it divides from Provence at Avignon. It discharges its waters into the Mediterranean by several mouths, a little below Arles.

THE VISTULA.

This river is likewise called the Weisel, and in Polish the Wisla. It rises in the Carpathian mountains, on the confines of Silesia and Upper Hungary; and, taking a northwest course through Little Poland, a part of Masovia, of Great Poland, and of Prussia, falls by three mouths into the Baltic, below Dantzic. Wassaw, the capital of Poland, and Thorn, which once boasted a very considerable trade, are situated on its banks. Great quantities of grain and timber, the growth of Poland, are sent down this river to Dantzic, and thence exported to foreign countries.

THE BLBE.

Nor far from the source of the above river, and in the principality of Javer, in Silesia, the Elbe rises in the GI-ANTS' MOUNTAIN. It divides Dresden, the capital of Saxony, into the old and new towns, between which there is a communication by a stone bridge, three thousand five hundred feet, (nearly three-fourths of a mile) in length, and in breadth eighty-five feet, provided with eighteen arches. Meissen, ten miles north-west of Dresden, is likewise situated on this river, over which is a bridge, supported by stone piers, but having a wooden superstructure: this bridge is considered as a master-piece of art, the middle arch, which is three hundred and seventy-five feet in width being kept together by a single wooden peg. The Elbe is the boundary of Brandenburgh toward the east, and there receives the Havel. It is the principle river in Lower Saxony. At Hamburgh it becomes of such a breadth and depth as to receive large ships. It discharges its waters into the German Ocean by the fortress of Glukstadt.

THE LOIRE.

Or the principal rivers which have their sources in France, the Loire is the most considerable, being still larger than the Rhone. It rises in the Cevennes mountains, in Lower Languedoc, and takes a course north and north-west, passing by the city of Orleans. It thence pursues a south and south-west course, by Tours and Angers, discharging itself into the bay of Biscay, forty miles below Nantz. Its entire course, comprehending its windings, is computed at five hundred miles; and in its progress it receives the Allier, Cher, Indre, Creuse, Sienne, and Maine. It communicates with the Seine by the canals of Briarte and Orleans. In November, 1790, it overflowed its banks, and laid a very large extent of country under water.

THE GARONNE.

True river rises at the foot of the Pyrenees, in the district of Cominges, and becomes navigable on the confines of Languedoc, being joined by many rivers in its course. It passes Toulouse and Bordeaux, below which it receives the

Dordogne, a river nearly of equal magnitude with itself. These united streams now take the name of the Gironde, become very broad, and empty themselves into the Bay of Biscay. By the means of this river, and a noble canal which will hereafter be described, a junction has been formed between the Mediterranean sea and the Atlantic.

THE SEINE.

This river rises near Dijon, in Burgandy, and, taking a north-west course, forms three islands on which the capital of France is situated. One of these, called l'Isle du Palais, communicates with the other parts of the city by seven bridges of stone, the principal of which is Pont-Neuf, provided with twelve arches, and having a breadth, including the parapets, of seventy-two feet. The Seine, in its passage through Normandy, flows by Rouen, and falls into the British Channel near Havre.

RIVERS OF SPAIN.

This kingdom abounds with rivers, the number of which, compreheading the smaller streams, is said to amount to one hundred and fifty. The principal of these are, the Minho, which rises in Gallicia; the Douro, which has its source in Old Castile, in a part of the mountains of Idubeda; and the Tagus, rising in a mountain of New Castile, through which province it passes, the city of Toledo being situated on its banks, and being encompassed by the river in the form of a horse shoe. It bounds the Portuguese province of Beira to the south, passes through that of Estremadura, and discharges itself into the Atlantic. Near the mouth of this river the Portuguese capital, Lisbon, is situated.

Indeed, all the great rivers which flow through Portugal, have their source in Spain. Thus the Gaudiana issues from New Castile, deriving its source from an assemblage of lakes, at a small distance from which it takes its course between several lofty mountains, concealing itself for nearly three miles, and then suddenly re-appearing in a fenny soil, but soon hiding itself again amidst reeds and rocks, which probably gave occasion to the mistaken idea of its losing itself under ground. This river separates the Spanish pro-

vince of Andalusia from the Portuguese province of Al-

garva.

The Guadalquivir, or Great River, by the ancients called Bætis, and Tartessus, rises in Andalusia, where several small streams, issuing from Mount Segura, unite in a lake from which this river flows. From Corduba to Seville, it is navigable by small craft only; but from the latter city to its mouth it receives ships of burthen, although it is dangerous on account of its many sand-banks.

The Ebro rises in the mountains of Santilane, in Old Castile, from two springs, and receives upwards of thirty brooks in its course, becoming navigable near Tudela. Its navigation is, however, dangerous on account of the rocks and shoals with which it abounds. It at length discharges itself into the Mediterranean, forming at its mouth the

small island of Alfacs.

In the province of Andalusia, the river Tinto, or Azeche, presents a singular phenomenon. Not only are its waters of so bad a quality as not to be potable, but it is asserted that they are noxious even to plants and to the roots of trees. It is consequently not the abode of fishes, or of any of those reptiles which breed in the aqueous element.

ITALIAN RIVERS.

Among the principal rivers of Italy, the following are the most worthy to be cited. The Po, which rises in Mount Viso, in Piedmont, one of the highest of the Alps. discharges itself into the Adriatic by seven mouths. It passes through Monserrat, the Milanese, and the Mantua, and washes the borders of the Parmesan territory, and a portion of the Milanese. It frequently overflows its banks, and causes great devastations.—The Adige has its source in the Rhætian Alps, and waters the cities of Trent and Verona: it is the only large river in Lombardy, and does not unite with the Po, but, like that river, flows into the Adriatic-The Arno flows from the Appenine mountains, and falls into the Tuscan sea near Pisa.—The Tiber, which issues from the Apenning mountains, at an inconsiderable distance from Rome, empties itself also into the sea of Tuscany. Its waters are generally so foul and muddy at Rome, that horses re not watered at its stream; but after reposing a few days

they become clear and fit to drink. The bed of this river being raised by the ruins of many edifices which have fallen into it, and its mouth much choked up, it frequently overflows its banks, more particularly during the prevalence of a strong south wind.

BRITISH RIVERS.

THE principal rivers of England are the Thames, the Severn, the Trent, and the Humber.

THE THAMES.

Thames, the most lov'd of all the Ocean's sons By his old sire, to his embraces runs; . Hasting to pay his tribute to the sea. Like mortal life to meet eternity. Nor are his blessings to his banks confin'd, But free and common as the sea or wind; Where he, to boast or to disperse his stores, Full of the tribute of his grateful shores, Visits the world, and in his flying tow'rs Brings home to us, and makes both Indies ours; So that to us no thing, no place is strange, While his fair bosom is the world's exchange. O could I flow like thee, and make thy stream My great example, as it is my theme! Though deep, yet clear; though gentle, yet not dull; Strong without rage, without o'erflowing full. DENHAM.

This fine river, if considered respectively to its course and navigation, is not to be equalled by any one in the known world. It rises from a small spring somewhat to the south-west of Cirencester, in Gloucestershire; and, taking an eastward course, becomes navigable at Lechlade for vessels of fifty tons. It there receives the river Colne, at a distance of about one hundred and thirty-eight miles from London. From Lechlade it continues its course north-east to Oxford, where it receives the Charwell; after which it runs south-west to Abingdon, and thence to Dorchester, where it receives the Thame, and continuing its course south-east, flows by the borders of Berkshire, Bucking-lamshire, Surrey, Middlesex, Essex, and Kent. In this extensive progress it passes along a multitude of towns and

fine picturesque villages; and, having visited London and Westminster, proceeds by Deptford, Greenwich, Wool-

wich, and Gravesend, to the sea.

To represent the beauties with which the banks of this noble river are embellished, between Windsor and London, would require the pencil of a Claude, or the pen of the sublimest of poets: besides numerous villages, they are adorned with magnificent seats and gardens, belonging to the nobility and gentry. The tide flows as high as Richmond, in Surrey—a distance which, following the winding course of the river may be computed at seventy miles from the sea. At London the depth of water is sufficient for the navigation of large ships, which renders it the greatest port for trade in the commercial world. Its water is justly esteemed exceedingly wholesome, and fit for use in the longest voyages, during which it ferments, and becomes fine and clear. The Thames, likewise, abounds with a great variety of fishes.

THE SEVERN.

This river springs from a small lake on the mountain of Plynlimmon, in Montgomeryshire, and is the principalbeauty of that part of Wales, in which it receives so many small streams, that it becomes navigable near the town of Montgomery. It passes through the centre of Shropshire, the towns of Shrewsbury and Bridgenorth being situated on its banks; and thence directs its course from north to south, through Worcestershire, taking the city of Worcester, and the town of Tewkesbury, in its route. Entering Gloucestershire, it runs by the city of Gloucester, and discharges itself into a large bay, called the Bristol channel, from the commercial city in its vicinity. About fifteen miles from its mouth, a navigable canal has been constructed, which conveys the waters of this river to within about two miles of Cirencester: they are then carried by a tunnel, or archway, fifteen feet in height above the surface of the water, through Saperton hill, an extent of two miles and three furlongs, for the purpose of communicating with the Thames at Lechlade. The Severn is distinguished by the abundance of salmon which frequent it, and by the lamprey, a fish almost peculiar to this river.

IRA CSANE

For river resonances the interplands in the northeress part of Arabinstohter, and disving consisted the primare of several glouders and streams, rues in the enterest. It hereasts navigation at Bornary may been, where it to ever in the continuation, and thereto the largest the district that great manipulation, and the matthesis species, the Hamber, often increased meanly two linearist rights. It enters Nottinglandary at the authorize point, and being their following the Language to the excitent and the matter party and being their following the Language to the excitent and the matter an education of the continuation of the analysis to the excitent of the morth, often a continuation of the language of the langu

The Trees to between a little believ therein he the kenny. nal many Direct, which endowed the mond continues mains adrestliculative, forms the formiting between it and Destry there, and pures the Trent of little bedry Harries. Amother veger, the Same, years a first entire to the great of Sam restriction from and talle total the Tonas on the sent for an A count for hom homest from Cherryticks, in Darky door width positive through the northern part of Northecham. thirm, communicates with the Tren or a little decause beour Garatanagh. In its course a subtrivious toward me town in through Surmand told, appeared at a mile and a hall in ratent, and so own this that the ternamenes of me and rang for soon at the attent. The antical exerts of the winter also tent there in his to whith, and or the decrees yard our lambard and eighty but beneath the endage of the with By the summore cands formed to the month of Comband, a communication to more up and make a the From and the Merrey, or quite our . the Mandain, issue 440 TH 107 M POST.

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and chiefly runs to the south-east. The Dun, or Don. rises in the hills near the south-west extremity of Yorkshire. where it is called the Sheaf, and running to the southward until it reaches Sheffield, turns to the north-east and falls into the Ouse. The Calder has its source in the border of Lancashire, and entering the south-west side of Yorkshire, runs eastward, and joins the river Aire. The Aire springsfrom the foot of a hill, called the Pennigent, and with a slow course, chiefly to the eastward, discharges itself into The Wharse or Wherse, rises among the hills the Ouse. in the west of Yorkshire, and flows with a swift and impetuous current, chiefly to the south-east, till it falls into the Ouse. The Swale rises among the north-west hills of Yorkshire, and, running to the south-east, joins the Nidd about four miles below Boroughbridge. The Derwent, which divides the North and East Ridings, rises in the northeast part of Yorkshire, near the sea-count, between Whitby and Scarborough, and first running to the south, winds to the west, and again to the south, falling at length into The river Hull has its source in the Woulds, the Ouse. whence it runs chiefly to the southward, passing near Beverley, and falls into the Humber. Into each of these rivers a great number of rivulets discharge themselves.

The Humber is formed at the confluence of the Ouse. and may rather be considered as a narrow bay than a river, being throughout its short course of an extreme width. Its whole extent to Spurnhead, a narrow peninsula which. terminates Yorkshine to the south-east, does not exceed thirty-six miles. By one of the rivers which flow into it. Yorkshire partakes, however, of the advantages derived from the great modern improvement, canals. A communication has been made between the western and eastern. coasts, across Lancashire and Yorkshire, by a canal which proceeds from the river Mersey, at Liverpool, to the Ouse, at Selby, sixteen miles above its junction with the Humber. It crosses the county of York, from Holme-bridge, four miles north-west of Skipton, to the Ouse, passing by Leeds; and has two subordinate branches, one leading to Bradford, and another to the vicinity of Wakefield, to facilitate the

communication between that place and Halifax.

THE PORTH.

This river, the most considerable in Scotland, has its origin from a lake under Ben Lomond, in the western angle of Sterlingshire, and runs eastward to Stirling, near which place it unites with the Teith, and forms Lake Katherine. From Stirling it flows west by south, and mixes with the German Ocean by a wide estuary, called the Firth of Forth. From its origin to Berwick, at the mouth of the Firth, its course, exclusive of windings, is seventy-five miles. It is navigable as far as Stirling for vessels of eighty tons burthen. Its winding stream, skirted by woods, by fertile and well-cultivated plains, and occasional ancient ruins; its waters, at times spreading themselves from a small breadth to the expanse of a lake; and the Lennox and Oichill hills rising from its northern bank, afford many pleasing and delightful prospects. A canal now joins this river to the Clyde.

THE TAY.

This river, springing from Benmore, on the western borders of Perthshire, runs north-east to a lake of the same name, one of the most beautiful in Scotland, at the extremity of which, being joined by the Lyon, it continues the same course to Logierait, where it receives the waters discharged by the Tumel river, from the lakes Ericht, under Ben Alat, the Rannoch, and the Tumel. From Logierait it flows south by east between Great and Little Dunkeld, and bends eastward, curving again to Cargil: near Cargilit receives the Isla from Forfar, and turns southward to Perth, receiving the river Earn from a lake of a similar name westward. It empties itself, by an estuary called the Firth of Tay, into the German Ocean. This river is navigable for vessels of burthen above Perth: the length of its course is nearly a hundred miles.

THE SHANNON.

Among the many navigable rivers of Ireland, the noble river Shannon asserts its preeminence. If the extent of its course, the richness and fertility of the fine country it waters, its great subserviency to commerce, and the excellent bay at its mouth, be considered, it may fairly rank among the most eminent rivers of Europe. It has its origin in

Lough or Lake Nean, eleven miles east-south-east of Stigo, the chief town of the county of that name, in the province of Connaught; whence, passing under Ballyntrane bridge, after a south-south-east course of five miles, it falls into Lough Allen. To Carrack, traversing this lake latitudinally, its course, for eight miles, is nearly south .--There it receives a stream which brings it from the right the superfluity of the waters of Lough Gara, and Lough Key; and after a winding course in a south-east direction, it flows into Lough Boffin, ten miles from Carrick. From the south-eastern extremity of the lake it takes a southwest direction, its current being now much broader, to Lough Ree, which it joins at Langsborough, and leaves at Athlone, seventeen miles south-south-east of its entrance into the lake. Thence bending to the west it receives the Suck from the right at Raghery nearly seventeen miles south-south-west of Athlone; and five miles beyond this point, the Brosna, from the left at Banagher, south-southwest of Raghery. From Banagher it makes a long course towards the west, and fourteen miles south-west of that place joins Lough Derg, which at Ballaloe, twenty-two miles south-south-west of its entrance into the Lough, it quits, pursuing the same course to Limerick, eleven miles distant, whence its direction is west by south to the sea. Between Limerick and the sea it receives several small rivers from the county of Clare; and the Maig, with others of inferior size, from the county of Limerick, on the left; and at its mouth the Cushion from Kerry. The mouth of this beautiful river is free from any bar, and forms a capacious bay eleven miles long, and from six to eight in breadth. exempt from every species of danger, and from any strong current; but, unfortunately, much exposed to western gales: some few sunken rocks, also, between Achnish Isle and Limerick, require a pilot's skill to avoid. This river is navigable from its mouth to Limerick for vessels of large burthen, and for vessels of inferior draught as far as Ballyntraue-bridge, at the extremity of Lough Allen, a hundred and eighty miles from abreast of Kerry Head. From Limerick, to avoid the rocks and shallows at the bend, a canal is cut seven miles in length; and the Grand Canal from Dublin, joining this river at Banagher, a communication is formed between the Shannon and the Irish sea.

LAKES.

AMERICAN LAKES.

The northern parts of this division of the globe are distinguished by their numerous and immense lakes, the five principal of which lie either wholly, or chiefly, in the two Canadian provinces: these are the lakes Superior, Huron, Ontario, Erie, and Michigan. These vast assemblages of fresh water, which are neither put in motion, nor alternately raised and sunk, by tides, are supposed to contribute very considerably to the greater degree of cold felt in the northern parts of America, than in the same parallels of latitude in Europe. They are situated within about seven degrees of latitude, and fourteen of longitude, or from 11° 35' to 49° north, and from 75° 20' to 92° west.

LAKE SUPERIOR.

This great North American Lake is justly entitled to the distinguished name it bears, not only because it is the largest expanse of fresh water in the known world, surpassing in magnitude the Asiatic salt-water lake improperly denominated "the Caspian sea," but because it has a much greater elevation than the other lakes of that country, the level of its waters being several hundred feet higher than the river St. Laurence. Its circumference is estimated at about fifteen hundred miles; but it has been observed by an intelligent navigator, Carver, that "if it were coasted round, and the utmost extent of each of the bays taken, it would exceed sixteen hundred!" . He coasted nearly twelve hundred miles on the north and eastern "When it was calm," he observes, "and the sun shone bright, I could sit in my canoe, where the depth was upwards of six fathoms, and could plainly see huge piles of stones at the bottom. The water at this time was pure and transparent as the air, and my canoe seemed as if it hung suspended in that element. It was impossible to look attentively, through this limpid medium, at the rocks beneath, for even a few minutes without feeling the

head swim, and the eyes no longer able to view the dazzling scene. This occurred in the month of July; and, although the surface of the water, from the heat of the atmosphere, was warm, still on letting down to the depth of about a fathem, the water drawn thence was so excessively cold, that it had nearly the same effect as ice, when taken into the mouth.

Lake Superior is said to receive nearly forty rivers and streams of water; the two principal rivers are the Alanipegon, from the north, and the Michipicooton, from the west. By the means of the latter a communication is established with the lakes of Bourbon, Winnipeek, and du Bois; and in this river the source of the St. Laurence is said to have been traced. A small river on the west, before it enters the lake, has a perpendicular fall from the top of a mountain, of more than six hundred feet, through a very narrow channel. In this lake, which has one passage only, St. Mary's strait, for the discharge of its waters, there are many islands, two of which are of great extent. The largest of them, Isle Royal, is nearly a hundred miles from east to west, and about forty miles from north to south. Miropau Isle is likewise of considerable extent; and at the entrance of West Bay is a cluster of small islands, called, "The twelve Apostles." On the south side of the lake is a peninsula, which spreads. into the lake sixty miles.

LAKE HURON.

This lake is next in magnitude to the one described above, being about a thousand miles in circumference. Its shape is nearly triangular; and on its north side is an island nearly an hundred miles in extent from east to west, and about eight from north to south: it is called by the Indians Manataukin, which signifies the abode of spirits. At the west point of the lake are the straits of Michillimackinac, which unite with lake Michigan; and about fifty miles to the north-east of these straits are those of St. Mary, by which lake Huron communicates with lake Superior.—They are about forty miles in length, and have falls, which are not, however, perpendicular, like those of Niagara, but the waters of which pass along a sloping bottom, and are on that account pamed The RAPIDS. These are about three

conversed a mile in length, have not an imperious it entired to an obstens. The southern however, the new content there was the account, which come after entarges into a count lake collect by Choice, from which ones unotire effect manner 18 from . The later descharges that find lake their, the distance between which and lake there is not between which and lake there is no become which and lake there is no become which and lake there is no become a later of the first and between the orders and lake the interest of the lake the interest of the orders and the content of the first and the interest of the orders and the content of the orders and the orders are the content of the orders and the orders are the orders and the orders are the orders and the orders are th

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Logge Afternoon, so the west of lake Hann, is loop and envisor, exceeding nearly two lumined miles from with-west to south-was, and leaving a movilit of firsty sailes from could be south. If twom these two lakes are unade to be mostly while man to a point to the nearly with aid on the case of a man to a point to the first bridge without he distributed by within which are extent lakes inhibited by Julium. This strait has to be long and mayor buy, called these they may be been about the himself or five, closely may near the films supply, and having my hards tubulated by a payments tribe of ludiums.

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In the southern part of the American continent, lake Mayacaybo is the only one deserving a particular notice. It communicates with the gulf of Venezuela, by a strait, on the western coast of which the city of Mayacaybo is situated. This lake is eighty leagues in circumference, and contributes equally to the beauty and convenience of the province of Venezuela, with which it is encompassed.—The gulf of this lake, which terminates in the Caribbean sea, extends about a hundred and ten miles from south to north.

ASIATIC LAKES.

LAKE ASPHALTITES.

This Lake is more usually known by the name of the DEAD SEA. It lies in Palestine, and is about fifty miles in length, and twelve or thirteen in breadth. It is surrounded by lofty mountains, and receives the river Jordan. It covers the ground on which stood the cities of Sodom and Gomorrah, buried; according to Strabo's report, by an earthquake, accompanied by frequent eruptions of fire, or, according to the scriptural expression, by a rain of sulphur. This lake is rendered remarkable by the great quality of the bituminous and inflammable substance, called Asphaltos, floating on its surface. This substance, having been thrown up from the bottom in a melted state, by the agency of subterraneous heat, and having become solid by the coldness of the water, is collected on the margin of the lake.

Doctor Clarke, in his recent travels, has removed the superstitious prejudices so long entertained relative to the Dead Sea, of which he gives the following animated de-

scription.

"The Dead Sea below, upon our left, appeared so near to us, that we thought we could ride thither in a very short space of time. Still nearer stood a mountain upon its western shore, resembling in its form, the cone of Vesuvius, and having also a crater upon its top, which was plainly discernible. The distance, however, is much greater than it appears to be; the magnitude of the objects beheld in this fine prospect, causing them to appear less remote than

the milly are. The amountains our remarkably alone and corners had not easy times of thems charges of employwhich his many writers, are out to a stufe them the over more of Links Asphaltires, nor from any neighbouring mountains. Exory thing about it was in the landers there, crowd and award. Its decotors, although majorthe, mannes, and and suited to the rates related concerning it by the infedds. route of the country, who all appeal at a with there a country. me to should from the parentees of its described allowerments and deadly toflames. He would but, our they, growe upon its always, which is no somer touched, than it becomes that and letter solve. In indition to its physical horners. the reason examile wish to be more perilous, owing to the foregrines tribes wandering upon the planes of the lake, than any other pain of the Haly Land. A pression for the more ellium tine them affered, for uges, take climpoteristics the unidianes associations of autoral scenery in the while world; he although it he new known that the waters of this lake, incommend of proving destructive of against tile, amore with extends of fisher; that instead of folling ciations to its valualitions, certain birds make it their pecuthat resort; that shalls abused upon its sharing that the presented ' that, consuming when,' is a matrial and as information printership of spatier, so the proportion the securitythe hingdome; that hadon alok or floor in it, occordance to the periportion of their gravity to the proving of the water; that the vapours are my more insolubrings than thus of any on the take; that is numerable Arabs people the newlighing. ing district, normally ambig all three tarts are one well established, even the latest waters by whom it is mention-A util one among the marker, from whose wateres amou of their troth-have been the court, continue to till their deoverigious with imaginary bearon and ideal phontons. which thanks less originating their the blue corner. decides on by around it, come their lengthened similars saying the mental and the Denal Em. 'The appropriate at it is commercial by the more the same alimbertary were much water a quantital with a claim are the ministral, and, it he flow while the there is now as hand, when a will be more procomplete office another to the form of the total of the state of the s wind weather an appealant, and long continue and sprant The three of Knowledge, and the leve of recoil his . .

tained to such a pitch, that every portion of the globe will be ransacked for their gratification."

THE CASPIAN SEA.

This large body of water, improperly called a sea, as it neither ebbs nor flows, nor has any visible connexion with the ocean, is the greatest lake in the eastern hemisphere. It is bounded on the north by the country of the Calmuc Tartars, on the east by Bucharia and a part of Persia, on the south by another part of Persia, and on the west by Persia and Circassia. Its length, from north to south, is about four hundred miles, and its greatest breadth, from east to west, three hundred. Within the last fifty years the water has risen so considerably, that it has made great inroads on the Russian side, both to the east and west of the Volga, and has rendered the adjacent country extremely marshy.

AFRICAN LAKES.

The only lake deserving of notice in this arid and sandy quarter of the globe, is that of Dambia, in Upper Ethiopia. In describing the Nile, it has already been mentioned that it is considered as the source of that interesting river. This lake contains twenty-one islands, several of which are very fertile, more particularly the largest, called Tzana, the name likewise bestowed by the natives on the lake itself. Its greatest extent, in a north-east and south-west direction, is about ninety miles, and its breadth thirty-six.

EUROPEAN LAKES.

THESE Lakes, although much inferior in size to several of those above described, merit a brief description on ac-

count of the phenomena they occasionally present.

LAKE LAGODA, in the western part of the Russian empire, lies between the gulf of Finland and lake Onega, and is one hundred and fifty miles in length, and ninety in hreadth. It is the largest lake in Furope; but is so full of quicks ands, which are constantly moved from place to place. by the frequent storms to which it is subject, that very danterman shalves are formed along its course. This led Peter that the cause a canal, nearly seventy English miles in length, seventy feet in breadth, and about eleven feet in

require to in our of a vary experient from the outerward manner, which has recently five shows, in lacks, and into a like in the outer through a lacks, and into a like in require to the common complexion of a copication of subtract the common complexions of a copication of subtract which the common complexions of a copication of subtract which the purpose was common and the different paper of to banks. Laws through a dispute the terminal life in and the lacks, and companients with the course by the river laws. It to one hundred and twenty wide in length, and by heart lacks to be needed to be needed to be needed to be needed.

The other principal Lakes of the porth of Europe are the fullwater. LAAA PARTIE, in Livenia, mustly severy miles in largely, and farty in brenath, cane into the gotf of finfaind by the river Nurva, and to celebrated for the abundance of the last with which it on mines - In Swinden Propes, which absorption like lakes, the most considerable is LARR MALES. straged between lipland, Sudermantand, and Westmanland. is to severity two notes to benefit, and is and to contain not then there handeed and nightly islands. It communinotes with the air by the months of the north and south rivers, which come it near Strakholm, and its bunds nor in comp part boundedly discontrol .- Land Warrante the most remarkable of the transferthese before to be to not in Plant Couldwid. It is minory miles in leavith, fitteen in mountab, and has but one outlet, by the rover Matola, Alphanich a received town and of sacty mould stream. The North First, and orders and elser, but very betweening in the winder engage. On its banks are build by the one in them, and rather provides shows.

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from the former of these places to Constance being called the Upper Lake, and that from Constança to Zell the

Lower Lake.

The Lake of Geneva resembles the sea, both in the colour of its water, the storms which are raised on it, and the ravages it makes on its banks. It receives different names from the coasts it washes, and has in summer something like the flowing and ebbing of the tide, occasioned by the melting of the snows, which fall more copiously into it at moon than at other times of the day. It it is shaped like a half moon, its convex side looking towards Smitzerland; having on that side a length of forty-eight miles, while towards Savoy its length does not exceed thirty-six. It is of such a depth as to be navigable for larger vessels than are commonly seen in rivers. Near Villeneuve, the Rhone discharges itself into it with such rapidity, that for the distance of half a league, the river water, which is very foul, continues unmixed with that of the lake, which is particularly clear.

Lago Maggiore, in the Duchy of Milan, is a most extraordinary lake, sixty miles in length, and six in its general breadth, with a depth of eight fathoms in the centre. It is surrounded on every side with hills covered with vinevards; and along its banks are rows of fine trees, and walls arched with vine branches. This enchanting prospect is heightened by several large natural cascades falling from the mountains. At the part where it widens into a bay, appear the two celebrated islands named Isola Bella. and Isola Madre, which have been compared to two pyramids of confectionary, adorned with green festoons and flowers. At one extremity of the garden of Isola Bella, are ten terraces, the perpendicular height of which. taken collectively, is more than two hundred feet above the level of the water of the lake. These terraces decrease proportionably in their circuit as they rise toward the top of the hill, where an oblong area, paved with fine stone, and surrounded with a ballustrade, affect a most delightful prospect. Isola Madre has seven terraces, which are high, but sloping, and at a considerable distance from each other, on which account it appears to be lower than Isola Bella, although the terraces have been planned of an equal height. Nature was, perhaps, never so successfully aided by the

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ALA PARACUE AND CASCADES

TABLE UP BLANCAS.

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right, and the line of cataracts winds obliquely across, instead of extending, in the shortest direction, from the one bank to the other. It ought to be observed, that the water does not precipitate itself down the vast abyss in one entire sheet, but, being separated by islands, forms three distinct collateral falls.

One of these is called THE GREAT, or HORSE-SHOE FALL, from the similarity of its form to that of a horse-shoe. It is situated on the north-west extremity of the river, and is most deserving of the attention of the spectator, as its grandeur is evidently superior to that of the adjacent cataracts, although its height may be considerably less. As the extent of this fall can be ascertained by the eye only, it is impossible precisely to describe its limits; but its circumference is generally computed at one thousand eight hundred feet, somewhat more than one third of a mile. Beyond the intervening island, the width of which may be equal to one thousand and fifty feet, is THE SECOND FALL. about fifteen feet wide; and at the distance of ninety feet. occupied by the second island, is situated Fort Scloper fall. so called from its proximity to that fort. The dimensions of this cataract may be reckoned equal to those of the large island; so that the entire extent of the precipice, including the intermediate islands, is four thousand and five feet; a computation which certainly does not exceed the truth. The quantity of water precipitated from the falls is prodigious; and agreeably to a late estimate, amounts to six hundred and seventy thousand, two hundred and fifty tons per minute.

From the eminence entitled "the Table Rock," the spectator has a fine prospect of the terrific Rapids, above the falls, and of the surrounding shores, embellished with lofty woods. He there sees to advantage the adjacent Horse-shoe fall, and the dread abyss, into which he may look perpendicularly from the edge of the rock, if his courage be equal to his curiosity. The immensity of the various objects which here present themselves to the view, infallibly overwhelms a stranger with astonishment, and several minutes must elapse before he can possibly collect himself sufficiently to form any just conception of the a wful and magnificent scene before him, which requires, that all its component parts should be separately examined, and

alson affirmly so truly surprising an exhibition, that persons who have resolved of its victority for assembly each peace, and who have been constantly habitanted to its calchitety, ingressed als achieved income in their fact obst, that they were reserved to before to different and different position problem.

From a chil proaty apprents to new executing of Four Becomes research, the falls are wen in a very ingressing point of some other speaking there, it is from is been magnificcont, but a admittely more be catalal than from was more distant. For envered with terms to the precipitor the evenis bounded, on either once, by speep and holly chille, compacand of earth and contra, which in most joins are preparation The designat to the hadrons of the falls to have arcomplished by two bullers, memed of borg plus from, with more her an their willen, an which the tenveller route his live, Above requelected signification a behind review recent fact and pendant trees, which more furtherman line with tomainmore in the structure. The breadth of the river he this pair is almost two tentions at and ton and the english on the egipeactor side, I core Sections a Lage opposite in a viety advantagroup point of view. About our built of the Haguardonag. was a come ded by the progressing elift, but he partied prosper to extremely from The histonical the farmer of three palls probabled with a towardful white hours wharlanezonta terms the rook for thank a change, but there and tree man she an like a shead of moder, as a the case with fact and the taxon tall, although he group to or concentration, as ve it would like a chann of arm, more the second habber, and there appeared to only of the classes. I to be lated, and alone the statut, to the time and take, are to be constructed soon, shortered gere and builtor of animals while a born hour suggest along by the agreemer suggests on the rule of

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with the effect produced by the feating currents, and the attered masses of stone, terms a cone wild and picturage. The account new taking a centrery direction, is suggested by the velocity, and arms a grand excent interagged by ingreen by. A quarter of a mile featier dearem similar effect as produced. After exhibitive an agreeable current directly din

The effect from the estimate at the riffeth ewently grand-old tests addresse. The proof grant depth of the descent it the material this appreciate tall paths in minutes and valuables of their control the availables of their navenues directly of their control from the first the first and the hard and holdes must control from the first of the desting waters, toroidy another to attract the attention, and to impress the mind of the spectation with annihilating of grands as and classified. The charles of plant papers, about a parameter where one is present a control of the object of the first of arms the course the promoter which with values of the first of a course of plants, with special to the with values grands of these at a pray, which spread in transling, must view are interrupted by the registrant to lands, or dissolved in the almosphery.

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THE TUCCOA PALL.

This fall, in Franklin County, Georgia, is as yet scarcely known to the best informed of our geographers, and is notwithstanding one of the most beautiful that can be conceived. It is much higher than the great fall of Niagara; and the water is charmingly propelled over a perpendicular rock. When the stream is full, it passes down the steep in one expansive sheet magnificent to behold.

FALLS OF THE MISSOURI.

THE most prominent features of this great American river which is fed by so many streams, having their sources in a great variety of soils and climates, are its wonderful falls, rapids, and cascades, the following connected view of which is abstracted from the very accurate draught and survey

made by Captain Clarke.

This river is nine hundred feet wide at the point where it receives the waters of Medicine river, which is four hundred and one feet in width. The united current continues five thousand four hundred and twelve feet, somewhat more than a mile, to a small rapid on the north side, from which it gradually widens to four thousand two hundred feet, and at the distance of nine thousand and forty-two feet (nearly a mile and three-fourths) reaches the head of the Rapids. narrowing as it approaches them. Here the hills on the north, which had withdrawn from the bank, closely border the river, which, for the space of a mile, makes its way over the rocks with a descent of thirty feet: in this course the current is contracted to sixteen hundred and forty feet. and, after throwing itself over a small pitch of five feet, forms a beautiful cascade of twenty-six feet five inches; this does not, however, fall immediately perpendicular, being stopped by a part of the rock, which projects at about one-third of the distance. After descending this fall, and passing the Cotton-wood island, on which the eagle has fixed its nest, the river goes on for eight thousand seven hundred and seventy-eight feet (more than a mile and a half) over rapids and little falls, the estimated descent of which is thirteen feet six inches, till it is joined by a large fountain boiling up underneath the rocks near the edge of the river, into

which it falls with a cascade of eight feet. It is of the most perfect clearness, and rather of a bluish cast; and even after falling into the Missouri it preserves its colour for half a mile. From this fountain the river descends with increased rapidity for the distance of three thousand tive hundred and thirty-one feet, during which the estimated descent is five feet: from this, for a distance of two thousand two hundred and twenty-seven feet, the river descends fourteen feet seven inches, including a perpendicular fall of six feet seven inches. The river has now become pressed into a space of one thousand four hundred and nineteen feet, and here forms a grand cataract, by falling over a plain rock, the whole distance across the river to the depth of forty-seven feet eight inches: after recovering itself, the Missouri then proceeds with an estimated descent of three feet, till at the distance of sixteen hundred and eighty-three feet it again is precipitated down the crooked falls of nineteen feet perpendicular; below this at the mouth of a deep ravine, is a fall of five feet, after which, for the distance of sixteen thousand and five feet (upwards of three miles) the descent is much more gradual, not being more than ten feet, and then succeeds a handsome level plain for the space of two thousand nine hundred and thirty-seven feet (more than half a mile,) with a computed descent of three feet, making a bend towards the north. Thence it descends, during seven thousand nine hundred and twenty feet, about eighteen feet and a half, when it makes a perpendicular fall of two feet, which is fourteen hundred and eighty-five feet beyond the great cataract, in approaching which it descends thirteen feet, within a distance of about six hundred feet, and gathering strength from its confined channel, which is only eight hundred and forty feet wide, rushes over the fall to the depth of eighty-seven feet and three quarters of an inch. After raging among the rocks, and losing itself in foam, it is compressed immediately into a bed of two hundred and seventy-nine feet in width; it continues for five thousand six hundred and ten feet to the entrance of a run or deep ravine, where there is a fall of three feet, which, joined to the decline of the river during that course, makes the descent six feet. As it goes on, the descent within the next three thousand nine hundred and sixty feet is only four

feet; from this, passing a run or deep ravine, the descent for one thousand six hundred feet is thirteen feet; within three thousand nine hundred and sixty feet, is a second descent of eighteen feet; thence two thousand six hundred and forty feet further, is a descent of six feet; after which, to the mouth of Portage creek, a distance of four thousand six hundred and twenty feet, the descent is ten feet.—From this survey and estimate it results that the river experiences a descent of three hundred and fifty-two feet in the course of two or three quarter miles, from the commencement of the rapids, to the mouth of Portage creek, exclusive of almost impassable rapids which extend for a mile below its entrance.

WATER-FALL OF SOUTH APRICA.

THE great chain of mountains which runs from north to south through the colony of the cape of Good Hope, divides into two branches, one of which stretches south-east, and the other due south. At the extremity of the latter branch is "the water-fall mountain," in one of the clefts of which a large stream of water falls from the high rock above, and presents, in the winter season, when swollen by the rains, a glorious spectacle. To view this fall to advantage, the traveller has to climb to a considerable height over the steep and broken rocks which form one side of the mountain, and, on reaching the top, sees it on the other side. Its height is estimated at between eighty and ninety feet, and its breadth at between thirty and forty. Adequate terms cannot be found to describe the sublimity of this scene, after abundant rains, when it is in its full beauty. In the vale beneath, the water is collected in a vast and deep basin, excavated in the stone; and by the side of the stream is a grotto, which runs within the rock to the depth of between thirty and forty feet. The arched entrance to this grotto is close to the falling water, when the stream is full. The rocks about it are thickly grown over with shrubs, which are then sprinkled by the The European travellers who proceed from Cape Town to the interior of south Africa, seldom fail to make a pilgrimage to this enchanting spot.

CATABACTS OF THE NILE.

This celebrated river, through its long and fertile range of about two thousand British miles, in winding through abrupt and precipitous countries, exhibits very considerable cataracts, ten or twelve of which, having a descent of more than twenty feet, occur, before it reaches the level of Egypt. The one which, by way of eminence, is called the CATARACT OF THE NILE, was visited by Mr. Bruce, from whose relation the following particulars are extracted.

At the distance of half a mile beneath the cataract, the river is confined between two rocks, over which a strong bridge of a single arch has been thrown, and runs into a deep trough, with great roaring, and an impetuous velocity. On ascending, the cataract presents itself amid groves of beautiful trees, and exhibits a most magnificent and stupendous sight, such as, Mr. Bruce observes, ages, added to the greatest length of human life, could not efface or eradicate from his memory. It struck him with a kind of stupor, and total oblivion of where he was, as well as of every sublumary concern. At the time of his visit, the river had been considerably increased by rains, and tell in one sheet of water, above half an English mile in breadth, and to the depth of at least forty feet, with a force and noise which were truly terrific, and which, for a time, stunned him, and made him giddy. A thick fume, or haze, covered the fall in every part, and hung over the course of the stream both above and below, marking its track, although the waters were not seen. although much swollen, preserved its natural clearness, and fell, partly into a deep pool, or basin, in the solid rock, and partly in twenty different eddies to the very foot of the precipice. In falling, a portion of the stream appeared to run back with great fury on the rock, as well as forward in the line of its course, raising waves, or violent ebullitions, which chased against each other.

CATARACT OF THE MENDER.

THE cataract which constitutes the source of this river, the Scamander of the ancients, is thus beautifully described

by Doctor Clarke. "Our ascent, as we drew near to the source of the river, became steep and rocky. Lofty summits towered above us, in the greatest style of Alpine grandeur; the torrent, in its rugged bed below, all the while foaming on our left. Presently we entered one of the sublimest natural amphitheatres the eye ever beheld; and here the guides desired us to alight. The noise of waters silenced every other sound. Huge craggy rocks rose perpendicularly, to an immense height; whose sides and fissures, to the very clouds, concealing their tops, were covered with pines. These grew in every possible direction, among a variety of evergreen shrubs; and enormous planetrees waved their vast branches above the torrent. approached its deep gulf, we beheld several cascades, all of foam, pouring impetuously from chasms in the naked face of a perpendicular rock. It is said the same magnificent cataract continues all seasons of the year, wholly unaffected by the casualties of rain or melting snow. Having reached the chasms whence the torrent issues, we found, in their front, a beautiful natural basin, six or eight feet in depth, serving as a reservoir for the water during the first moments of its emission. It was so clear that the minutest object might be discerned at the bottom. The copious overflowing of this reservoir causes the appearance, to a spectator below, of different cascades, falling to the depth of about forty feet, but there is only one source. Behind are the chasms whence the water issues. We entered one of these, and passed into a cavern. Here the water appeared, rushing with great force, beneath the rock, towards the basin on the outside. The whole of the rock about the source was covered with moss; close to the basin grew hazel and plane trees; above were oaks and pines; and all beyond a naked and fearful precipice.".

The bold and precipitous country of the Alps offers a variety of water falls and perpendicular torrents which are well deserving of notice; more particularly those in the vicinity of Mount Rosa, a part of the northern boundary of Piedmont. The river Oreo, fed by numerous streams from Mount St. Gothard, Mount Cenis, and several branches of the Appenines, forms, at Cerosoli a vertical cascade estimated at four hundred fathoms, or two thousand four hundred feet; while the torrent Examon, de-

scending from another part of Mount Rosa, exhibits a tall of more than two hundred fathoms, rolling down pebbles of quartz, veined with the gold which is occasionally traced in the mountains of Challand. The CASCATA DEL MARMORE, OF MARBLE CASCADE, so denominated from the mountain down which the Velcino falls being almost wholly of marble, lies about three miles from Terni. In proceeding towards it, the traveller is struck with terror on viewing the precipices, which are of a romantic height; but is sufficiently rewarded, when, on reaching the summit of the mountain, he regards the stupendous cataract, formed by the river as it rushes from the mountain. Having reached the declivity of its channel, the waters descend with a rapid course for a short space, and then fall from a perpendicular height of three hundred feet, breaking against lateral rocks, which cause vapours to ascend much higher than the summit of the cataract, by which the neighbouring valley receives a perpetual fall of rain. After this descent, the waters rush into the cavities of the rocks, and then bursting through several openings, at length reach the bed of the river.

The GRAND CASCADE OF THE ANIO, near Tivola, flows down the edge of a steep rock; and at its foot, the water, in a succession of ages, has hollowed grottoes of various shapes and sizes, so beautifully picturesque as to baffle all description. Of these, the grotto of Neptune is the most celebrated. Near to it are three smaller cascades, which rush murmuring through the ruins of the villa Mecænas, down the woody steep which forms the opposite bank of the river, and present the painter with one of the most picturesque views imaginable, the foreground varying beautifully at every step he takes.

In Savoy, the Arvo flows many miles between high, craggy, and inaccessible rocks, which appear to have been purposely cleft to give its waters a free passage. The surprising echoes and continual sounds occasioned by its streams, the trampling of the horses and mules, the transpling of the horses and mules, the transpling of the horses and mules, reverberated three, four, and even in some parts six or seven times, with a noise so deep and wild, as to strike with terror the traveller who is unaccustomed to them; and the firing of a gun or pistol, is there more terrible than the loudest claps

of thunder. A steep precipice, with monstrous impending rocks, which seem ready to fall, joined to the roaring of the river, add largely to the general sublimity. The cataracts of this river are more or less loud and terrible, in proportion as the waters are more or less swollen by the melting snows, with which the tops of the mountains are covered. One in particular, called the Nun of Arpena, falls from a prodigiously high rock with great noise and violence: its descent is said to exceed eleven hundred feet.

In Dalmatia, the river Cettina forms a magnificent cascade, called by the inhabitants Velica Gubavisa, to distinguish it from a less fall a little below. The waters precipitate themselves from a height of above one hundred and fifty feet, forming a deep majestic sound, which is by the echo resounding between the steep and naked marble banks. Many broken fragments of rocks, which impede the course of the river after its fall, break the waves, and render them still more lofty and sonorous. By the violence of the repercussion, their froth flies off in small white particles, and is raised in successive clouds, which are scattered, by the agitation of the air, over the valley. When these clouds ascend directly upward, the inhabitants expect the noxious south-east wind called the sirocco.

The fall of the Staub-Bach, in the valley of Lauterbrannen, is estimated at nine hundred feet of perpendicular height; and about a league from Scaff hausen, at the village of Lauffen, in Switzerland, is a tremendous cataract of the Rhine, where that river precipitates itself from a rock said to be seventy feet in height, and not less than

four hundred and fifty feet in breadth.

In Sweden, near Gottenburgh, the river Gotha rushes down from a prodigiously high precipice into a deep pir, with a dreadful noise, and with such amazing force, that the trees designed for the masts of ships, which are floated down the river, are usually turned upside down in their fall, and shattered in pieces. They frequently sink so far under water, as to disappear for a quarter of an hour, half an hour, and sometimes for three quarters of an hour. The pit into which the torrent precipitates them, is of a depth not to be ascertained, having been sounded with a line of several hundred fathoms, without the bottom being found.

In addition to the stupendous North American cataracts already described, may be noticed the one formed by the river Passaick, which discharges itself into the sea at the porthern extremity of the State of New Jersey. About twenty miles from the mouth of this river, where it has a breadth of about a hundred and twenty feet, and runs with a very swift current, it reaches a deep chasm, or cleft, which crosses its channel, and falls about seventy feet perpendicular in one entire sheet. One end of the cliff is closed up, and the water rushes out of the other with incredible rapidity, in an acute angle to its former direction, and is received into a large basin. It thence takes a winding course through the rocks, and spreads again into a very considerable channel. The cleft is from four to twelve feet in breadth, and is supposed to have been produced by an earthquake. When this cataract was visited by a late British traveller, the spray formed two beautiful rainbows. primary and secondary, which greatly assisted in producing as fine a scene as the imagination can conceive. was heightened by another fall, though of less magnificence, about ninety feet above. The falls of St. Anthony, on the river Mississippi, descend from a perpendicular height of thirty feet, and are nearly eight hundred feet in width, while the shore on each side is a level flat, without any intervening rock or precipice.

In England, among the cataracts which merit a brief mention, may be cited the one in Devonshire, near the spot where the Tamer receives the small river Lid. The water there falls above a hundred feet: it proceeds from a mill at some distance, and after a course on a descent of nearly one hundred feet from the level of the mill, reaches the brink of the precipice, whence it falls in a most beautiful and picturesque manner, and, striking on a part of the cliff, rushes from it in a wider cataract to the bottom, where falling again with great violence, it makes a deep and foaming basin in the ground. This fine sheet of water causes the surrounding air at the bottom to be so impregnated with aqueous particles, that those who approach it find themselves in a mist.—In Cumberland there are several cataracts; but these are exceeded in beauty by a remarkable fall of the Tees, on the western side of the county of Durham, over which is a bridge suspended by chains, seldom passed unless by the adventurous miners.—Asgarth force, in Yorkshire, is likewise a very interesting fall.

In Scotland, the Fall of Fyers, near Lock-Ness, is a vast cataract, in a darksome gless of a stupendous depth. The water rushes beneath, through a narrow gap between two rocks, and thence precipitating itself more than forty feet lower into the bottom of the chasm, the found, like a great cloud of smoke, rises and fills the air. . The sides of this glen are stupendous precipices, blended with trees overhanging the water, through which, after a short space, the waters discharge themselves into the lake. About half a mile to the south of this fall, is another which passes through a narrow chasm, whose sides it has undermined for a considerable distance. Over the gap is a true Alpine bridge, formed of the trunks of trees covered with sods. from the middle of which is an awful view of the water roaring beneath. In Perthshire, the river Keith presents a very considerable cataract, the noise produced by which is so violent as to stun those who approach it.-The western coast of Ross-shire is, however, peculiarly distinguished by these natural wonders, among which may be cited the grand catagact of the river Kirkag, and the cascade of Glamma, which latter being situated amid the constant obscurity of woody hills, is truly sublime.

In Ineland, the noble river Shannon has a prodigious cataract, which, at about fifty miles from its mouth, prevents it from being longer navigable for vessels of a large

burthen.

SPRINGS AND WELLS.

SAINT WINIFRED'S WELL.

[See Plate, No. 47.]

HOLYWELL, in Flintshire, is famous for ST. WINIFAED'S Well, one of the finest springs in the world. On account of the sanctity in which it was holden, it gave name to the town. This well pours out, each minute, twenty-one tone of water, which, running to the middle of the town, down the side of a hill, is made use of by every house as it passes, after which it turns several mills, and is employed in various

manufactures, which greatly increase the population of the place, and its neighbourhood. Over the spring, where a handsome bath has been erected, is a neat chapel, supported by pillars, and on the windows are painted the chief events of St. Winifred's, or, as it was anciently written Wenefrede's About the well grows moss, which the ignorant and superstitous devotees most stupidly imagine to be St. Winifred's hair. This saint is reported to have been a virgin Martyr, who lived in the seventh century, and, as the legend says, was ravished and beheaded in this place by a pagan tyrant; the spring having miraculously risen from her blood. Hence this bath was much frequented by Popish pilgrims, out of devotion, as well as by those who came to bathe in it for medicinal purposes. Mr. Pennant says, "the custom of visiting this well in pilgrimage, and offering up devotions there, is not yet entirely laid aside: in the summer a few are to be seen in the water, in deep devotion, up to their chins for hours, sending up their prayers, or performing a number of evolutions round the polygonal well."

It might have been supposed that the present enlightened age would have been secure against a repetition of impostures of this kind; but Doctor Milner, a Catholic Bishop, of Woolverhampton, has taken much pains to persuade the world that an ignorant proselyte, of the name of Winefrid White was there cured of various chronic diseases so late as the year 1804, by a miracle. Sir Richard Phillips, having, in the Monthly Magazine, referred this pretended miracle to the known effect of strong faith on ignorant minds, in any proposed means of cure, has been attacked by the catholic clergy for his incredulity; but in number 302 of the Monthly Magazine, he replies in the following words.

"We have no doubt whatever that Winefrid White was cured by her journey to Holywell, and by bathing in the wonderful natural spring at that place; but we are not credulous enough to believe that her cure was effected by any antagonist properties of the water to the cause of her disease—nor impious enough so to sport with ETERNAL OMNIPOTENCE as to assert that a capricious suspension of the laws of Nature took place for this purpose. On the contrary, we believe that the poor woman was cured by causes



compared to a summer of the first product of the large products of the sum of

The center is each to almost with the proceeds of a micross reach, which it deposeds, but where it a bangold not man cally, and leaves is unumatations on the leaves, once, and which it meets with, in tricking thus downly through the cardiocs of the rock. This space is estimated to a oil forth theory gallons of verter in a mount. There are no to come places at terms, little meet, with their every and a variety of other objects, and a variety of other objects, which meets are more which in the contract of t

WIGAR WELL.

Amore a mile from Wigan, in Camandares, to a spening. the water of which tearer like rat. On applying a lightest camble to the surray, a larger large to antitouty me have. and barns stymogen. I dustrial at mater haring bears Taken up as the part a home the flavor last spons of placet comile hal to he that there one one manufactorisation patrick the party to this part hads and then up like water to a pad on the firm, but does to a first search on busing incline When to still many extended lawry, on making of thou, and preventing the thinter of treds were to the granted part that which was about they having here. the core was a foundary model along applied to the earlier of at the day matter in the same parish where the material war. besegred, the finners take free, and have while a ecopile-reduceof the the come at the thomas now introduction have word in hate prior the entire or the earth. Is to continue disconnect, the that of a folium out his to a neither has it any neither the My me the the tarme in their wester, burney any somethis have the times improvemently consent of a Assessment to air; our levels one you, and it weight is to me

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served, that the whole of the country about Wigan for the compans of several miles, is underlaid with coal. This phenomenon may therefore be referred to the same cause which occasioned the dreadful explosion of Felling Colliery; but in the present case, this destructive gas, instead of being pent up in the bowels of the earth, accompanies the water in its passage to the surface.

BROSELBY SPRING.

This celebrated boiling spring, or well, at Broseley, in Shropshire, was discovered in the month of June, 1711. It was first announced by a terrible noise in the night, there having been a remarkable thunder-storm. Several persons who resided in the vicinity having been awakened in their beds by this loud and rumbling noise, arose, and proceeding to a bog under a small hill, about two hundred yards from the river Severn, perceived a surprising commotion and shaking of the earth, and a little boiling up of water through the grass. They took a spade, and digging up a portion of the earth, the water immediately flew up to a great height, and was set on fire by a candle which was presented to it. To prevent the spring from being destroyed, an iron cistern has been placed over it, provided with a cover, and a hole in the centre, through which the water may be viewed. If a lighted candle or any burning substance, be presented to this aperture, the water instantly takes fire, and burns like spirit of wine, continuing to do so as long as the air is kept from it; but on removing the cover of the cistern, it quickly goes out. The apparent boiling and ascent of the water of this spring, are still more obviously the result of hydrogen gas, or inflammable air, than in the preceding instance of Wigan well.

HOT SPRINGS OF ST. MICHAEL.

In the eastern part of this island, or one of the Azores, is a round deep valley surrounded by high mountains, in which are many hot springs; but the most remarkable is that called THE CALDEIRA, situated in the eastern part of the valley on a small eminence by the side of a river, on which is a basis about thirty feet in diameter, where the water continually boils with prodigious fury. A few yards distant from it is

y covered in the other of a trank, in which the water boils in a threatlast manner, three tag out a thick, muckly, specimus, water, several years, from the amounting while a letterant theme. In the install of the civer use consulations where the were trulle with an internet a healt, that a greater comme the lite fermer him to a return bridge continue. Also be beauth a are several apertures, out of telicibilities may be to the mustage and property in the first on all the set from the representation all by also hands. The letter pinets, the equorister would be but in suppose that the feethers of a farmired frames are this my in commerty while sulphureons arresto to as our he a strongent idea on "The finding every new strong upon. are covered with jour birmaning, significant from the them while became time the granual. In the conditioners whenever the about times, many of the lightheams property tin Ir toud.

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Two Trees, a country of Phrygie, in Asia Minist of while I my was the reputal, almosts will be market. the nome interesting one of which in this described he Charter Chicken. It is situated more a plant collect. Benne. lundry, equalying literally " The head of the opening." and grotes preparationally out of the waith, twine main the houtened a markle and gratists result entry oral characters. the a most war - the tonors from of Holywoll la Thusantee. Its surface seems rate metally builting, and, throng sold wonther, the conferenced a spear almost by course the syncarcises of a cloud at among one the well. While the generally exactly of other his the mires are, is man, where the thirtheathern was planged by the main, to have -"Youth the paration the mornets of this spring, makes were was a specifying to the excession. In wanty page of the dimension through which the Mendey there. from the make thather priority are money and theore opposings, an allibraries advertises and catalogic technique

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quantities beneath the surface of the earth; and frequently. as has been seen in the phenomena of volcanoes and earthquakes, burst forth from enormous openings, with tremendous destruction. It often bappens, however, that the openings are small and porous, and that the vapours ascending through them, are simply combined with water. Hence that almost infinite variety in the characters of these springs, fountains, and lakes, the waters of which are combined with extraneous substances. In some cases the elastic gases, or vapours, ascend from specific levity alone. and are destitute of all taste and odour; insomuch that springs are found which bubble without boiling, or betraying heat or any other foreign quality. In other cases they are strongly impregnated with heat; and are then either tepid or boiling, according to the proportion of extricated caloric they contain. Occasionally, whether hot or cold, they are blended with metallic, sulphureous, saline, and other substances, and hence assume the name of mineral waters; while, if the substance thus dissolved be combustible, as naphtha, bitumen, or turpentine, the fountain will often inflame and burn on the application of a lighted torch.

The water of the noted Boiling spring at Peroul, near Montpelier, is observed to heave and boil up very furiously in small bubbles, which manifestly proceed from a vapour breaking out of the earth, and rushing through the water, so as to throw it up with noise, and in many bubbles; for on digging in the vicinity of the ditch where the spring lies, and pouring fresh water on the dry spot newly dug, the same boiling is immediately observed. A similar bubbling of the water is likewise found near Peroul on the sea shore. In several dry places near the spring, are small venti-ducts, passages, or clefts, whence steam issues; and at the mouths of these passages, small light bodies, such as feathers, pieces of straw, leaves, &c. being placed, are soon blown away. This vapour, on the application of a lighted candle or torch, does not flame or take fire, as is the case with that of the boiling spring at Wigan; so that there are two different sorts of steam, to occasion these boilings, at the same time that neither of the fountains is medicinal, or even warm.

Other boiling waters, of a very different temperature

possess, like those of the hot springs of St. Michael, a sufficient degree of heat to boil eggs, and to serve for other culinary purposes. Among these may be instanced those of the Solfatrara, near Naples; those on the summit of Mount Zebio, in the Modenese territory; and those which constitute the source of the imperial bath at Aix la Chapelle. In Japan, a hot spring is said to burst forth which constantly maintains the boiling point, and the water of which retains its heat much longer than common water. It does not flow regularly, but during an interval of two hours each day; and the force and violence of the vapours are then so great, that large stones are ejected, and raised to the height of ten or twelve feet, with a noise like that of the explosion of a piece of artillery.

From the phenomena which have been adduced, it appears that the exhalations constantly escaping from the vast subterraneous magazines in which they are prepared, vary greatly in their qualities and effects. Some are cold and dry, resembling air or wind, as those near Peroul, and in the cavities of mountains, especially those of Æolus, and other hills of Italy; as well as in particular mines. Others are inflammable, and of a bituminous nature, though not positively warm, as those of Wigan well .-Others are very hot, sulphureous, and saline, more especially those of the natural stoves, sweating vaults, grottoes, baths, and volcanoes near Naples, Baiæ, Cuma, and Puzzuoli, as also in some of the subterraneous works at Rome. And others, again, are of an arsenical, or other noxious quality, as those of the Grotta del Cane. Now, these various streams meeting with, and running through water, must occasion in it a great variety of phenomena and

effects.

It is observed by Doctor Thomson, in his history of the Royal Society, that the hot spring at Bath has continued at a temperature higher than that of the air for a period of not less than two thousand years, although it is so far distant from any volcano, that, without a very violent and improbable extension of the agency of volcanic fires, it cannot be ascribed to them. There are various decompositions of mineral bodies, which generate considerable heat; or, to speak more properly, water is itself the decomposed substance generating heat by its decomposition.

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The evolution or exotic gas is a proof that the heat of the Bath waters is owing to a particular decomposition which takes place within the bowels of the earth. The greatest heat of these waters, is 116° of Fahrenheit's scale; but that of the mineral waters of Carlsbad, in Bohemia, ascends to 165°.

RECIPROCATING EQUNTAINS, OR SPRINGS, May be cited among the most curious phenomena of nature. An irregularity of flow is not uncommon in boiling springs: but there are other aprings which evince a periodical influx and reflux almost as regular as the tides of the ocean,-These changes, it will be seen, frequently occur several times in a day, or even in an hour. They are ascribed to various causes, either subterraneous, or superficial; but in general, springs and lakes of this description have been ascertained to communicate with others beneath, through pores or apertures of various diameters, which serve equally to carry off the waters, and to supply them afresh. In such cases the flux and reflux of the upper head of water. must necessarily, depend on the state of that beneath; and the causes which alternately augment and diminish the latter, must produce a similar effect on the former.

PADERBORN SPRING, in Westphalia, disappears twice in twenty-four hours, returning constantly, after a lapse of six hours, with a great noise, and so forcibly as to drive three mills at a short distance from its source. The inhabitants call it the bolderborn, that is, the boisterous spring. LAY-WELL spring, near Torbay, is about six feet in length. tive in breadth, and nearly six inches deep. The flux and reflux, which are very visible, are performed in about two minutes; when the spring remains at its lowest ebb for the space of about three minutes. In this way it ebbs and flows twenty times within the hour. as the water begins to rise, many bobbles ascend from the bottom; but on its falling, the bubbling instantly ceases .- GIGGLESWICK SPRING, in the West Riding of Yorkshire, lies at the foot of a hill of limestone named Giggleswick Scar. Its reciprocations are irregular, both with respect to duration and magnitude, the interval of time between any two succeeding flows being sometimes greater, and at other times less, insomuch that a just tandard of comparison cannot be formed. The rise of the water, in the stone trough, or cistern, which receives it, during the time of the well's flowing, is equally uncertain, varying from one inch to nine or ten inches, in the course of a few reciprocations. This spring, like the preceding one, discharges bubbles of air at the time of its flowing.—Near the Lake or Bourger, in Savoy, is a reciprocating spring which rises and falls with a great noise, but not at stated and regular times. After Easter, its ebbiags and flowings are frequently perceived six times in an hour; but in dry seasons not more than once or twice. It issues from a rock, and is called la Fontaine de Merville, the marvellous fountain.

BITUMINOUS AND OTHER LAKES.

PITCH LAKE OF TRINIDAD.

NEAR point LA BRAYE, TAR POINT, the name assigned to it on account of its characteristic feature, in the Island of Trinidad, is a Lake which at the first view appears to be an expanse of still water, but which, on a nearer approach, is found to be an extensive plain of mineral pitch, with frequent crevices and chasms filled with water.-On its being visited in the autumnal season, the singularity of the scene was so great, that it required some time for the spectators to recover themselves from their surprise, so as to examine it minutely. The surface of the lake was of an ash colour, and not polished or smooth, so as to be slippery, but of such a consistence as to bear any weight. It was not adhesive, although it received in part the impression of the foot, and could be trodden without any tremulous motion, several head of cattle browsing on it in perfect security. In the summer season, however, the surface is much more yielding, and in a state approaching to fluidity, as is evidenced by pieces of wood and other substances, recently thrown in, having been found enveloped in it. Even large branches of trees, which were a foot above the level, had, in some way, become enveloped in the bituminous matter. The insterstices, or chasers, are very numerous, ramifying and joining in every

direction; and being filled with water in the wet season, present the only obstacle to walking over the surface.— These cavities are in general deep in proportion to their width, and many of them unfathomable: the water they contain is uncontaminated by the pitch, and is the abode of a variety of fishes. The arrangement of the chasms is very singular, the sides invariably shelving from the surface, so as nearly to meet at the bottom, and then bulging out towards each other with a considerable degree of convexity. Several of them have been known to close up entirely, without leaving any mark or seam.

The pitch lake of Trinidad contains many islets covered with grass and shrubs, which are the haunts of birds of the most exquisite plumage. Its precise extent cannot, any more than its depth, be readily ascertained, the line between it and the neighbouring soil not being well defined; but its main body may be estimated at three miles in circumference. It is bounded on the north and west sides by the sea, on the south by a rocky eminence, and on the east

by the usual argillaceous soil of the country.

MUD LAKE OF JAVA.

THE following details relative to the volcanic springs of boiling mud in Java are extracted from the Penang Gazette.

Having received an extraordinary account of a natural phenomenon in the plains of Grobogna, fifty paals north-east of Solo; a party set off from Solo the 25th Sept. 1814, to examine it.—On approaching the dass or village of Kuhoo. they saw between two topes of trees in a plain, an appearance like the surf breaking over rocks with a strong spray falling to leeward. Alighting, they went to the 'Bluddugs,' as the Javanese call them. They are situated in the village of Kuhoo, and by Europeans are called by that name. found them says the narrator, to be an elevated plain of mud about two miles in circumference, in the centre of which, immense bodies of soft mud were thrown up to the height of ten to fifteen feet, in the form of large bubbles, which, bursting, emitted great volumes of dense white smoke.-These large bubbles, of which there were two, continued throwing up and bursting seven or eight times in a minute; at times they threw up two or three tons of mud. The

party got to the leeward of the smoke, and found it to stink like the washings of a gunbarrel.—As the bubbles burst, they threw the mud out from the centre, with a pretty loud noise, occasioned by the falling of the mud on that which surrounded it, and of which the plain is composed. It was difficult and dangerous to approach the large bubbles, as the ground was all a quagmire, except where the surface of the mud had become hardened by the sun;—upon this, we approached cautiously to within fifty yards of one of the largest bubbles, or mud-pudding, as it might properly be called, for it was of the consistency of custard-pudding, and was about a hundred yards in diameter:—here and there, where the foot accidentally rested on a spot not sufficiently hardened to bear, it sunk—to the no small distress of the walker.

"We also got close to a small bubble, (the plain was full of them, of different sizes,) and observed it attentively for some time. It appeared to heave and swell, and, when the internal air had raised it to some height, it burst, and the mud fell down in concentric circles; in which state it remained quiet until a sufficient quantity of air again formed internally to raise and burst another bubble, and this continued at intervals of from about half a minute to two

minutes.

"From various other parts of the pudding round the large bubbles, there were occasionally small quantities of sand shot up like rockets to the height of twenty or thirty feet, unaccompanied by smoke:—this was in parts where the mud was of two stiff a consistency to rise in bubbles.

The mud at all places we came near was cold.

"The water which drains from the mud is collected by the Javanese, and, being exposed in the hollows of split hamboos to the rays of the sun, deposits crystals of salt. The salt thus made is reserved exclusively for the use of the Emperor of Solo; in dry weather it yields thirty dudgins of 100 cattles each, every month, but, in wet or cloudy weather, less.

"Next morning we rode two and a half paals to a place in a forest called Ram am, to view a salt lake, a mud hillock,

and various boiling pools.

"The lake was about half a mile in circumference, of a dirty-looking water, boiling up all over in gurgling eddies

but more particularly in the centre, which appeared like a strong apring. The water was quite cold, and tasted bit-

ter, salt, and sour, and had an offensive smell.

About thirty yards from the lake stood the mud-hillock, which was about fifteen feet high from the level of the earth. The diameter of its base was about twenty-five yards, and its top about eight feet—and in form an exact cone. The top is open, and the interior keeps constantly boiling and heaving up like the bluddugs. The hillock is entirely formed of mud which has flowed out of the top. Every rise of the mud was accompanied by a rumbling noise from the bottom of the hillock, which was distinctly heard for some seconds before the bubble burst;—the outside of the hillock was quite firm. We stood on the edge of the opening and sounded it, and found it to be eleven fathoms deep. The mud was more liquid than at the bluddugs, and no smoke was emitted either from the lake, hillock, or nools.

"Close to the foot of the hillock was a small pool of the same water as the lake, which appeared exactly like a pot of water boiling violently;—it was shallow, except in the centre, into which we thrust a stick twelve feet long, but found no bottom. The hole not being perpendicular, we

could not sound it without a line.

"About 200 yards from the lake were two very large pools or springs, eight and twelve feet in diameter; they were like the small pool, but boiled more violently and stunk excessively. We could not sound them for the same reason which prevented our sounding the small pool.

"We heard the boiling thirty yards before we came to the pools, resembling the noise of a waterfall. These pools did not overflow—of course the bubbling was occasioned by the rising of air alone. The water of the bluddugs and

of the lake is used medicinally by the Javanese."

ATMOSPHERICAL PHENOMENA.

METEORS.

From look to look, contagious through the croud. The panic runs, and into wond rous shapes The appearance throws: armies in meet array, Thronged with aerial spears and steeds of fire: Till the long-lines of full-extended war In bleeding light commixt, the sanguine flood Rolls a broad slaughter o'er the plains of heaven, As thus they scan the visionary scene, On all sides swells the superstitious din, Incontinent; and busy frenzy talks Of blood and battle; cities overturned, And late at night in swallowing earthquake sunk, Or hideous wrapt in fierce ascending flame ; Of sallow famine, inundation, storm; Of pestilence, and every great distress: Empires subversed, when ruling fate has struck The unalterable hour: even nature's self Is deemed to totter on the brink of time. Not so the man of philosophic eye, And aspect sage; the waving brightness he Curious surveys, inquisitive to know The causes, and materials, yet unfixed, Of this appearance beautiful and new.

THOMSON.

THE nature of these splendid phenomena of the heavens cannot be so well elucidated as by an extract from the travels of M. M. Humboldt and Bonpland to the equinoctial regions of the New Continent. The sublime wonders described by the former of these travellers were witnessed by them at Cumana, a city of South America, and capital of the province of that name.

"The night of the 11th of November, 1779, was cool and extremely beautiful. Toward the morning from half after two, the most extraordinary luminous meteors were seen towards the east. M. Boupland, who had risen to enjoy the freshness of the air in the gallery, perceived them a first. Thousands of bolides, (fire-balls,) and falling stars. Succeeded each other during four hours. Their direction was very regular, from north to south. They filled a space in the sky extending from the true east 30° towards the

north and south. In an amplitude of 60° the meteors were seen to rise above the horizon at east-north-east, and at east to describe arcs more or less extended, falling toward the south, after having followed the direction of the meridian. Some of them attained a height of 40°; and all exceeded 25° or 30°. There was very little wind in the low regions of the atmosphere, and this blew from the east. No trace of clouds was to be seen. M. Bonpland relates, that from the beginning of the phenomenon, there was not a space in the firmament equal in extent to three diameters of the moon, which was not filled at every instant with bolides and falling stars. The first were fewer in number. but as they were seen of different sizes, it was impossible to fix the limit between these two classes of phenomena.-All these meteors left luminous traces from five to ten degrees in length, as often happens in the equinoctial regions. The phosphoresence of these traces, or luminous bands, lasted seven or eight seconds. Many of the falling stars had a very distinct nucleus, as large as the disc of Jupiter, from which darted sparks of vivid light. The bolides seemed to burst as by explosion; but the largest, those from 1° to 1° 15' in diameter, disappeared without scintillation, leaving behind them phosphorescent bands (trabes) exceeding in breadth fifteen or twenty minutes, or sixtieth parts of a degree. The light of these meteors was white, and not reddish, which must be attributed, no doubt, to the absence of vapours, and the extreme transparency of the air. For the same reason, under the tropics, the stars of the first magnitude have, at their rising, a light evidently whiter than in Europe.

"Almost all the inhabitants of Cumana were witnesses of this phenomenon, and did not behold these bolides with indifference; the oldest among them remembered the great earthquakes of 1766 were preceded by start phenomena. The fishermen in the suburbs assemble that the fire-work had begun at one o'clock; and that, as they returned from fishing in the Gulf, they had already perceived very small falling stars towards the east. They affirmed at the same time, that igneous meteors were extremely rare on those coasts after two in the morning.

"The phenomenon ceased by degrees after four o'clock, and the bolides and falling stars became less frequent;

hid too still discongulation where thereon the more possible is show whited light, and the aspidier at their movement. a specific of an lower after punction. This communitaries will appear has astronationer, when I come that in full day light, in 178%, the intestor of the honors in the mark of Permy are was highly eliminated by an assality of lamming grave situate. It present over the town when the pen was shining dearly, about one o'clock. M. Donnburd and wwell, theyne our record residence of Contents, after less by showered on the Mids of September, 1400, the immersion of the first noted like at Jupiter, succeeded in ageing the planet darknessy. with the noked eye, eighteen amount after the disc of the an had appeared in the herizon. There was a very slighvapour in the cast, but Jupiter appeared on un axure sky. These focus prove the extreme parity and transparency of the atmosphere under the enrice come. The gave of difused light is so much less, us the supports fire more prefacily dismissed. The came cause that weakens the difturing of the miss light, diminushes the variation of that which emanates either from a links, Jupitor, or the money, seen on the served day after her conjunction.

"The reservice of M. Chiedal having angularly time! he attention of the scientific world upon the bolider and fulling stars at my departure from Europe, we the out negest during the course of our journey from Cornects to the Rio Nogro, to enquire every where, whether the motores of the 12th of November bud been perceived. In a coungu country, where the greater number of the inhabitant taken out in the dir, so extenutionary a phonomeron could not bil to be remarked, except when concealed by clouds from the eye of almereation. The Capuelin missionary a San Fernundo de Apura, a village element agaid the sa male of the province of Yurinas; and the Pennelsons units marriaged near the estaracts of the Ornovako, and bi Maros, on the franks of the Rin Negro : Indiana untuber less falling attre and hulales dimentes the work of heaven. Marco is availabled of Company, at our hundred and seventy-free baryon distances. All these abservers compared the phinocomous as a boundful firewist, which had harted from three till air to the entermine. Jume at the marke had marked the day upon their raised anders had acted to by the nearon (convals of the about timber

nately, none of them could recollect the direction of the meteors, or their apparent height. From the position of the mountains and thick forests which surround the missions of the cataracts and the little village of Maroa, I presume that the bolides were still visible at 20° above the horizon. On my arrival at the southern extremity of Spanish Guyanna, at the little fort of San Carlos, I found a party of Portuguese, who had gone up the Rio Negro from the Mission of St. Joseph of the Maravitains, and who assured me, that in that part of Brazil, the phenomenon had been perceived, at least as far as San Gabriel das Cachoei-

ras, consequently as far as the equator itself.

"I was powerfully struck at the immense height which these bolides must have attained, to have been visible at the same time at Cumana, and on the frontiers of Brazil. in a line of two hundred and thirty leagues in length. what was my astonishment, when at my return to Europe. I learnt, that the same phenomenon had been perceived on an extent of the globe of 64° of latitude, and 91° of longitude; at the equator, in South America, at Labrador. and in Germany! I found accidentally during my passage from Philadelphia to Bordeaux, in the memoirs of the Pennsylvanian Society, the corresponding observations of Mr. Ellicott (lat. 30° 42'); and, upon my return from Nardes to Berlin, I read the account of the Moravian Missionaries among the Eskimoes, in the library of Gottingen .-Several philosophers had already discussed at this period the coincidence of the observation in the north with those at Cumana, which M. Bonpland and I had published in 1800.

"The following is a succinct enumeration of facts:—

1st, the fiery meteors were seen in the east, and the east north-east, to 40° of elevation, from 2 h. to 6 h. at Cu (lat. 10° 27' 52", long. 66° 30'); at Porto Cabello (lat. 6' 52", long. 67° 5'); and on the frontiers of Brazil, near the equator, in the longitude of 70° west of the meridian of Paris. 2d, In French Guiana (lat. 4° 56', long. 54° 55'), the northern part of the sky was seen all on fire. Innumerable falling stars traversed the heavens during an hour and a half, and diffused so vivid a light, that those meteors might be compared to the blazing sheaves shot out from a fre-ork. 3d, Mr. Ellicott, astronomer to the United States, hav-

ing terminated his trigonometric operations for the rectification of the limits on the Ohio, being, on the 12th of November. in the Gulf of Florida, in the latitude of 25°, and longitude 81° 50', saw, in all parts of the sky, 'as many meteors as stars, moving in all directions: some appeared to fail perpendicularly; and it was expected every minute that they would drop into the vessel.' The same phenomenon was perceived upon the American continent as far as the latitude of 30° 42'. 4th, In Labrador, at Nain (lat. 56° 55',) and Hoffenthal (lat. 58° 4'); in Greenland, at Lichtenan (lat. 61° 5'), and at New Herrenhut (lat. 64° 14', long. 52° 20'); the Eskimoes were frightened at the enormous quantity of bolides which fell during twilight toward all points of the firmament, some of them being a foot broad. 5th, In Germany, M. Zeissing, vicar of Itterstadt near Weimar (lat. 50° 59', long 9° 1' east), perceived, on the 12th of November, between the hours of six and seven in the morning, when it was half after two at Cumana, some falling stars, which shed a very white light. Soon after. toward the south and south-west, luminous rays appeared from four to six feet long: they were reddish, and resembled the luminous track of a sky-rocket. During the morning twilight, between the hours of seven and eight, the south-west part of the sky was seen, from time to time, strongly illuminated by white lightning, which ran in serpentine lines along the horizon. At night the cold increased, and the barometer rose.

"The distance from Weimar to the Rio Negro, is 1800 sea leagues; and from Rio Negro to Herrenbut in Greenland, 1300 leagues. Admitting that the same fiery meteors were seen at points so distant from each other, we must also admit, that their height was at least 411 leagues. Near Weimar, the appearance like sky-rockets was seen in the south, and south-east; at Cumana, in the east, and in the east-north-east. We may therefore conclude, that numberless aerolites must have fallen into the sea, between Africa and South-America, to the west of the Cape-Verde Islands. But, since the direction of the bolides was not the same at Labrador and at Cumana, why were they not perceived in the latter place towards the north, as at Cayenne? I am inclined to think, that the Chayma Indians of Cumana-did not see the same bolides as the Portuguese in Brazil,

and the mistionaries in Labrador; but, at the same time, it cannot be doubted, and this fact appears to me very remarkable; that in the New World, between the maridians of 46° and 82°, between the equator and 64° north, at the same hour, an immense number of belides and falling stars were perceived; and that those meseus had every where the same brilliancy, throughout a space of 921,000 square leagues.

4 The scientific men who have lately made such laboriour researches on falling stars and their parallaxes, consider them, as meteors belonging to the farthest limits of our atmosphere, between the region of the Autora Borealis and that of the lightest clouds. Some have been seen, which had not more than 14,000 toises, or about five leagues of clevating. The highest do not appear to exceed thirty leagues. They are often more than a hundred feet in diameter ; and their swiftness is such, that they durt, in a few seconds, over a space of two leagues. Some of these have been measured, the direction of which was almost perpendicularly upward, or forming an angle of 50° with the vertical line. This extremely remarkable circumstance has led to the conclusion, that falling stars are not acrelites, which, after having hovered about a long time in space, take fire on entering accidentally into our atmosphere, and fall towards: the earth.

"Whatever may be the origin of these luminous meteors, it is difficult to conceive any instantaneous inflammation taking place in a region, where there is less air than in the vacuum of our air-pumps; and where (25,000 toises high) the mercury in the barometer would not rise to 0-012 of a line. We have asceptained the uniform mixture of atmospheric air to 0.003 nearly; only to an elevation of 3000 toises: consequently, not beyond the last stratum of fleory clouds. It might be admitted, that, in the first revolutions of the globe, gaseous substances which yet remain unknown to us, may have risen towards that region, through which the falling stars pass: but accurate experiments, made upon mixtures of gases which have not the same specific gravity, prove, that we cannot admit a superior stratum of the atmosphere entirely different from the inferior strata. Gaseous substances mix and penetrate each other with the set motion; and a uniformity of their mixture would have

when where in the lapse of ages, notices we suppose in them the effects of a regulator action unexampled in those entersposs which we can antijest to our observations. Facilier, if we admit the existence of a particular aerial flaid in the insernabible region of luminous meteors, fulling stars, politics, and the Aurora Berralis, how can accompaise who the whole strutum of those fluids does not of once take use. but that the gaverns ommunions, like the abouts, occupy only limited appears flow can we supplement electrical explosion without name various vallected together, empalde of containing unrequal charges of electricity, is air, the mean temperature of which is, perhaps, 230 below the freezing moint of the centizated theremmeter, and the carefaction of which is no compularable, that the compression of the electrient cluich could scarcely disengage any heat? These difficulties would in great part, be removed, if the direction of the motion of falling stars allowed to to consider themes hodies with a solid nuclear, as cosmic phenomeso (bolungs ing to space beyond the limits of our atmosphere's and not as tellune phenomeno / belonging to our planes only.).

"Supposing that the nativers of Common were valy as the usual bright at which falling stars in general move, the same meteors were seen above the horizon in places more than \$10 leagues discant from each other. Now, what an extraordinary disposition to incondessence areas have religion on the 1 like of November, in the higher regions of the atmosphere, to have harnished, during tout bourn, myriads of buildes and initing stars, visible of the equator, in Green-

land, and in Germany.

Mr. Honcembery indiciously observes, that the same many, which residues the phenomenon more frequent, has been an influence on the larguests of the meteors, and the messity of their light. In Europe, the nights when there are the greatest pointer of taking steen, are those in which very bright occasion made with very small mess. The periodicularities of the planetonium augments the interest which is exclusive. There are remarked, in which the literature which is exclusive. There are remarked to are to improve and, out violate to discount which is the most of the literature of the area of the planeton of the interest of the interes

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of smaller meteors. If the falling stars be very frequent during one night, it is very probable that this frequency will continue during several weeks. It would seem that, in the higher regions of the atmosphere, near that extreme limit where the centrifugal force is balanced by gravity, there exists, at regular periods, a particular disposition for the production of bolides, falling stars, and the Aurora Borealis. Does the periodicalness of this great phenomenon depend upon the state of the atmosphere? or upon something which the atmosphere receives from without, while the earth advances in the eliptic? Of all this we are still

ignorant as men were in the days of Anaxagoras.

"With respect to the falling stars themselves, it appears to me, from my own experience, that they are more frequent in the equinoctial regions than in the temperate zone; more frequent over the continents, and near certain coasts, than in the middle of the ocean. Do the radiation of the surface of the globe, and the electrical charge of thelower regions of the atmosphere, which varies according to the nature of the soil, and the positions of the continents and seas, exert their influence as far as those heights, where eternal winter reigns? The total absence even of the smallest clouds, at certain seasons, or above some barren plains destitute of vegetation, seems to prove, that this influence can be felt at least as far as five or six thousand toises high. A phenomenon analogous to that of the twelfth of November, was observed thirty years before, on the table-land of the Andes, in a country studded with volcanoes. At the city of Quito, there was seen, in one part of the sky, above the volcano of Gayamho, so great a number of falling stars, that the mountain was thought to be in flames. This singular sight lasted more than an hour. The people assembled in the plain of Exico, where a magnificent view presentsitseld of the highest summit of the Cordilleras. A procession was already on the point of setting out from the Convent of St. Francis, when it was perceived, that the blaze of the horizon was caused by fiery meteors, which ran along the skies in all directions, at the altitude of twelve or thirteen degrees."

The bolides, or fire-balls, and falling stars, so striking an example of which is given above, are of all sizes, from a small shooting star of the fifth magnitude, to a cone or cylinder of two or three miles in diameter. They differ

in consistency as much as in dimensions, and in colour as much as in either. Occasionally, they are a subtile, luminous and pellucid vapour; and sometimes a compact ball, or globe, as though the materials of which they are formed, were more condensed and concentrated. Not unfrequently they have been found to consist of both, and consequently to assume a comet-like appearance, with a nucleus or contpact substance in the centre, or towards the centre, and a long, thin, pellucid, or luminous main, or tail, sweeping on each side. They are sometimes of a pale white light; at others, of a deep igneous crimson; and, occasionally irridescent and vibratory. The rarer meteors appear frequently to vanish on a sudden, as though abruptly dissolved or extinguished in the atmospheric medium, their flight being accompanied by a hissing sound, and their disappearance by an explosion. The most compact of them, or the nuclei of those which are rarer, have often descended to the surface of the earth, and with a force sufficient to bury them many feet under the soil; generally exhibiting marks of imperfect fusion and considerable heat. The substance is, in these cases, for the greater part metallic; but the ore of which they consist is not any where to be found, in the same constituent proportions, in the bowels of the earth. Under this form the projected masses are denominated aerolites, or meteoric stones.

It may not be uninteresting to preface a succinct account of the most surprising of these meteors, by a brief notice of the hypotheses which have been imagined concerning them; however justly the learned Humboldt may have concluded, in the words of the extract given above, that we are still "as ignorant on this subject as men were in the days of Anaxagoras." Sir J. Pringle contended, with other philosophers, that they are revolving bodies, or a kind of terrestrial planets. Doctor Halley conjectured them to consist of combustible vapours, accumulated and formed into concrete bodies on the outskirts, or extreme regions of the atmosphere, and to be suddenly set on fire by some unknown cause; an opinion which, with little difference, has been since entertained by Sir. W. Humilton and Dr. King. Dr. Blagdon regarded them altogether as electrical phenomena. M. Izarn believed them to consist of volcanic materials, propelled into the atmosphere in the course of explosions of great violence. M. Chladai supposed them to be formed of substances existing exteriorly to the atmosphere of the earth, and other planets, which have never incorporated with them, and are found loose in the vast ocean of space, being there combined and inflamed by causes unknown to us. Lastly, the most favourite hypothesis is, that the whole, or, at least, the more compact division of these meteors, are made up of materials thrown from immense volcanoes in the moon. This hypothesis, which was started by M. Olbers, in 1795, has been since very plausibly supported by the celebrated Laplace, but does not apply to the smeller and: less substantial: meteors, named shooting stars. Hence these philosophers derive the latter phenomena from some other cause, as electricity, or terrestrial exhalations; and observe, in support of the distinction they find it necessary to make, that shooting stars must be of a different mature from fire-balls, since they sometimes appear to ascend as well as to fall. This observation has been especially dwelt on by MM. Chladni and Bensenbury. both of them favourably noticed, as accurate observers, by Humboldt.

On the 21st of March, 1676, two hours after sunset, an extraordinary meteor was seen to pass over Italy. At Bononia, its greatest altitude in the south-south-east was 38°; and at Sienna, 58° towards the north-north east. In its course, which was from east-north-east to west-southwest, it passed over the Adriatic sea, as if coming from Dalmatia. It crossed all Italy, being nearly vertical to Rimini and Savigniano, on the one side, and to Leghorn on the other: its perpendicular additude was at least thirty-eight miles. At all the places near its course it was heard to make a hissing noise as it passed, like that of artificial fire-works. In passing over Leghorn, it gave a very load report; like that of a cannon; immediately after which another sort of sound was heard, like the rattling of a deeply-loaded: wagger hassing ever the stones, which continued for several seconds. . The professor of mathematics at Bononia calculated the apparent velocity of this surprising mescor at not less than one hundred and sixty miles in a minute of time, which is above ten times as swift as the diurnal rutation of the earth under the equinoctial, and not many times less than that with which the annual motion of the earth about the sun is

performed. It there appeared larger than the moon is one discusser, and shows half as larger again in the order which, with the given distance of the eye, made its real number discusses above ball is only, and the larger own in properties. It is, therefore, one suspending, that as present body, passing with such as unusuing velocity through the large forest ratified it may be in its upper regions, absolute against a body a distance. It finally want off to you towards Coroles.

Two luminous meteors of great negaltade were observed. at Lespaic within the space of six years. On the 22d of May, 1650, about three in the morning, the first of these uns seen to the great terror of the speciation, descending to the north, and leaving behind it a long whitestreak where it but passed. As the more phenomena was witnessed. to the north-north-rost at Brachurg, and about Humburgh, Lubra, and Studented, all of which places are about a linedend and trity English miles from Leipsic, it was enacladed that this tortour was exceedingly high above the earth. The second nuttoor was still more terrine. On the ab of fuly. 1686, at half past one in the marning, a fire-ball with a sail was observed in \$4 degrees of Aquation, and a degrees mette, which continued nearly stationary for seven or eight minutes, with a diameter nearly equal to half the minute's diameter. At first, its light was so great that the speciathe shall are to read by it; other which it gradually beapposted. This phenumenan was abserved at the same time in so werel called places, more especially at Schlaitze, a true formus from Hantage tarty lengtish miles towards the worth, in alternite living gluon to above the conthernburicon. At Lauric it was estimated to be destruct not more than sixty Logist ades, and to be about twenty-four miles perpensiraler names the hustons, as that it was at least chirty miles high in the me.

A the nationalities y present, which the common people allost a liaming event, was tired event of Louis, in Yorkstone, and the loth of him, (7 of), as a quarter where ten as anyth. Its direction was from much as much is was found to make and, and another a lie with the specialistic as reactabling a multiple matring with the world only increases. The light was an audient including the providence of the light was an audient including the providence of the light was an audient including the providence of the light was an audient with the large of the light was an audient and being by the providence of the light was an audient with the contraction of the light was an audient with the contraction.

neither sun nor moon shone upon them. This meteor was, in its course, seen, not only in Yorkshire and Lancashire, but also in the counties of Nottingham and Derby, notwithstanding which, each of those who observed it, although so many miles distant from each other, fancied it fell within a few yards of him. In disappearing, it presented bright sparklings at the small end.

A blazing meteor was, on the 19th of March, 1719, seen in every part of England. In the metropolis, about a quarter after eight at night, a sudden powerful light was perceived in the west, far exceeding that of the moon, which then shone very bright. The long stream it gave out appeared to be branched about the middle; and the meteor, in its course turned pear-fashioned, or tapering upwards. At the lower end it came at length to be larger and spherical, although not so large as the full moon. Its colour was whitish, with an eye of blue of a most vivid dazzling lustre, which seemed in brightness very nearly to resemble. if not to surpass, that of the body of the sun in a clear day. This brightness obliged the spectator to turn his eyes several times from it, as well when it was a stream, as when it was pear-fashioned and a globe. It seemed to move, in about half a minute or less, about the length of twenty degrees, and to disappear about as much above the horizon. Where it had passed, it left behind a track of a cloudy or faint reddish yellow colour, such as red-hot iron or glowing coals have: this continued more than a minute, seemed to sparkle, and kept its place without falling. This track was interrupted, or had a chasm towards its upper end, at about twothirds of its length. Not any explosion was heard, but the place where the globe of light had been, continued for some time after it was extinct, of the same reddish yellow colour with the stream, and at first sparks seemed to issue from it, such as proceed from red hot iron beat out on an anvil.

It was agreed by all the spectators in the capital, will the splendour of this meteor was little inferior to that of the sun. Within doors the candles did not give out any light; and in the streets, not only all the stars disappeared, but the moon, then nine days old, and high near the meridian, the sky being very clear, was so far effected as scarcely to be seen: it did not even cast a shade, where the beams of the meteor were intercepted by the houses; so that, for a

few seconds of time, there was in every respect a resem-

blance of perfect day.

The perpendicular height of this surprising meteor was estimated at 64 geometrical miles; and it was computed to have run about 300 of these miles in a minute. It was seen, not only in every part of Great Britain and Ireland, but likewise in Holland, in the hither parts of Germany, in France, and in Spain, nearly at the same instant of time. The accounts from Devonshire, Cornwall, and the neighbouring counties, were unanimous in describing the wonderful noise, which followed its explosion. It resembled the report of a large cannon, or rather of a broadside, at some distance, which was soon followed by a rattling noise, as if many small-arms had been promiscuously discharged. This tremendous sound was attended by an uncommon tremour of the air; and every where in those counties, not only the windows and doors of the houses were sensibly shaken, but, according to several of the reports, even the houses themselves, beyond the usual effect of cannon, however near.

On the 11th of December, 1741, at seven minutes past one in the afternoon, a globe of fire, somewhat larger than the horizontal full moon, and as bright as the moon appears at any time when the sun is above the horizon, was seen at l'eckham, in Surry, in a south-south-east direction, moving towards the east with a continued equable motion, and eaving behind it a narrow streak of light, whiter than the globe itself, throughout its whole course. Towards the end it appeared less than at the beginning of its motion; and within three or four seconds suddenly vanished. Its apparent velocity was nearly equal to half the medium velocity of the ordinary meteors called falling or shooting etars; and its elevation, throughout the whole of its course, about twenty degrees above the horizon.

On the 18th of August, 1783, an uncommon meteor was seen in several parts of Great Britain, as well as on the continent. Its general appearance was that of a luminous ball, which, rising in the north-north-east, nearly of a globular form, became elliptical, and gradually assumed a tail as it ascended. In a certain part of its course it underwent a remarkable change, which might be compared to bursting, and which, it ought to be observed, has been since

Date of the Google

frequently noticed in the passage of the neutites, or meteoric stones, particular mention of which will be made hereafter. After this it no longer proceeded as an entire mass,
but was apparently divided into a great number, or cluster
of balls, some larger than others, and all carrying a tail, or
leaving a train behind. Under this form, it continued its
course with a nearly equable motion, dropping, or casting
off sparks, and yielding a predigious light, which illumined
all objects to a surprising degree; until, having passed the
cast, and verging considerably to the southward, it gradually distended, and was at length lost to the sight. The
time of its appearance was 9h. 16m. P. M. mean time of
the meridian of London, and it continued visible about
half a minute.

This beautiful meteor having been seen in Shetland, and in the northern parts of Scotland, ascending from the morth, and rising like the planet Mars, little doubt was entertained of its course having commenced beyond the farthest extremity of this island, somewhere over the northern ocean. Having proceeded over Essex, and the Straits of Dover, it probably entered the continent not far from Dunkirk, where, as well as at Calais and Ostend, it was thought to be vertical. Still holding on its occurse to the southward, it was seen at Brussels, at Paris, and at Nuits in Burgundy; insomuch that there was sufficient proof of its having traversed thirteen or fourteen degrees of latitude, describing a track of at least one thousand miles over the surface of the earth;—a length of course far exceeding the extent of what had been then ascertained of any similar phenomenon.

During the passage of this meteor over Brussels, the moon appeared quite red, but soon accovered its natural light. The results of several observations give it an elevation of more than fifty miles above the surface of the earth, in a region where the air is at least thirty thousand times rarer than here below. Notwithstanding this great elevation, the fact of a report having been heard some time after it disappeared, rests on the testimony of too many witnesses to be controverted. It was compared to the falling of some heavy body in a room above stairs, or to the discharge of one or more large cannon at a distance: this report was loudest in Lincolnshire, and the adjacent

counties, and also in the castern parts of Kent.

Supposing the transverse diameter of this meteor to have subtended an angle of 30 minutes when it passed over the zenith, and that it was fifty miles high, it must have been almost half a mile across. The tail sometimes appeared ten or twelve times longer than the body; but most of this was train, and the real elongation behind seems seldom to have exceeded twice or thrice its tranverse diameter: is consequently was between one and two miles in length. Now, if the cubical contents be considered, for it appeared equally round and full in all directions, such an enormous mass must afford just matter of astonishment, when the extreme velocity with which it moved is considered. This velocity agreeably to the observations of Sir W. Herschel and several other astronomers, could not have been less than 20 miles in a second, exceeding that of sound above ninety times, and approaching toward that of the earth in her annual orbit. At such a rate it must have passed over the whole island of Great Britain in less than half a minute, and would, in the space of less than seven minutes, have traversed the whole diameter of the earth!

On the 4th of October of the above year, 1783, two meteors were seen in England. The first, at three in the morning, on account of the early hour, was witnessed by but few spectators, who represented it as rising from the north to a small altitude, and then becoming stationary with a vibratory motion, and an illumination like day-light: it vanished in a few moments, leaving a train behind. This sort of tremulous appearance has been noticed in other meteors, as well as their continuing stationary for some time leither before they begin to shoot, or after their course is ended. The second of these meteors appeared at fortythree minutes past six in the evening, and was much smaller, and also of much shorter duration, than the one seen in August. It was first observed to the north, like a stream of fire, similar to that of the common shooting stars, but large; and having proceeded some distance under this form, suddenly burst out into that intensely bright blueish light, peculiar to such meteors, which may be most aptly compared to the blue lights of India, or to some of the largest electrical sparks. The illumination was very great; and on that part of its course where it had been so bright, a dusky red streak or train was left, which remained

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visible about a minute, and was thought by some gradually to change its form. Except this train, the meteor had not any tail, but was nearly of a round body, or, perhaps, somewhat elliptical. After moving not less than ten degrees in this bright state, it became suddenly extinct, without any appearance of bursting or explosion.

AEROLITES.

[Sec. 12.]

THESE phenomena, otherwise entitled meteoric stones, have been ascertained, by recent observations, to be connected with the BOLIDES, or fire-balls, described above. Scoriaceous masses have frequently been either actually seen to fall at the time of the disappearance of the latter, or have been found soon after on the surface of the earth. Most of the stones which have fallen from the atmosphere have been preceded by the appearance of luminous bodies, or meteors. These meteors burst with an explosion, and then the shower of stones falls to the earth. Sometimes the stones continue luminous till they sink into the earth; but most commonly their luminousness disappears at the time of their explosion. These meteors move in a direction nearly horizontal, and seem to approach the earth before they explode.

The stony bodies, when found immediately after their descent, are always hot. They commonly bury themselves some depth under ground. Their size differs, from fragments of a very inconsiderable weight, to masses of geveral tons. They usually approach the spherical form, and are always covered with a black crust; in many cases they smell strongly of sulphur. The black crust consists chiefly of oxide of iron; and from several accurate analyses of these stones, the following important inferences have been discovered on our globe which contain the same ingredients; and that they have made us acquainted with a species of pyrites not formerly known, nor any where else to be found.

The ancients were not unacquainted with these meteoric stones, a shower of which is reported by Livy to have. fallen at Rome under the Consulate of Tulius Hostilius, and ther under that of C. Martius and M. Torquatus. Pliny

relates that a shower of iron (for thus he designates these stones) fell in Lucania, a year before the defeat of Crassus, and likewise speaks of a very large stone which fell near the river Negos, in Thrace. In the chronicle of Count Marcellin, there is an account of three immensely large stones having fallen in Thrace, in the year 452 before the Christian era. To proceed to more modern, and well authenticated instances of the fall of aerolites.

On the 7th of November, 1492, a little before noon, a dreadful thunder-clap was her than Ensisheim, in Alsace, instantly after which a child sampling stone fall on a field newly sown with wheat. On searching, it was found to have penetrated the earth about three feet, and weighed 260lbs, making its size equal to a cube of thirteen inches the side. All the contemporary writers agree in the reality of this phenomenon, observing that, if such a stone had before existed in a ploughed land, it must have been known

to the proprietor.

The celebrated astronomer Gassedi relates an instance of an aerolite descent of which he was himself an eye witness. On the 27th of November, 1627, the sky being clear, he saw a burning stone fall on Mont Vasir, in the southeast extremity of France, near Nice. While in the air, it seemed to be about four feet in diameter; was inclosed in a luminous circle of colours like a rainbow; and in its fall produced a sound like the discharge of cannon. It weighed 39lbs. was very hard, of a dull metallic colour, and had a specific gravity considerably greater than that of marble.

In the year 1672, two stones fell near Verma, in Italy, the opperighing 300, the other 200lbs. This phenomenon was witnessed in the evening, by three or four hundred persons. The stones fell, with a violent explosion, in a sloping direction, and in calm weather. They appeared

to burn, and ploughed up the ground.

Paul Lucas, the traveller, relates that when he was at Larissa, a town of Greece, near the gulf of Salonica, a stone weighing 72lbs. fell in the vicinity. It was observed to come from the northward, with a loud hissing noise, and seemed to be enveloped in a small cloud, which exploded when the stone fell. It looked like iron dross, and smelt of sulphur.

In September 1753, several stones fell in the province

of Bresse, to the west of Geneva: one in particular fell at Pont-de-Vesle, and another at Liponas, places nine miles distant from each other. The sky was clear, and the weather warm. A loud noise, and a hissing sound, were heard at those two places, and for several miles round, on the fall of these stones, which exactly resembled each other, were of a darkish dull colour, very ponderous, and manifesting on their surface that they had suffered a violent degree of heat. The largest weighed about 20lbs, and penetrated about singles into the ploughed ground; a circumstance which is there is thighly improbable that they could have existed there before the explosion. This phenomenon has been described by the astronomer Delalande, whose strict enquiries on the spot enabled him to testify the truth of the circumstances he relates.

In the year 1768, three stones were presented to the French Academy of Sciences, which had fallen in different parts of France; one at Luce, in the Maine; another at Aire, in Artois; and the third in Cotentin. They were all externally of the same identical appearance; and on the former of them a particular report was drawn up by Messrs. Fougeraux, Cadet, and Lavoisier. This report states, that on the 18th of September, 1768, between four and five in the afternoon, there was seen, near the above village of Luce, a cloud in which a short explosion took place, followed by a hissing noise, but without any flame. same sound was heard by several persons about ten miles from Luce; and, on looking up, they perceived an opaque body describe a curve in the air, and fall on a piece of green turf near the high road. They immediatel than to the spot, where they found a kind of stone, half buried in the earth, extremely hot, and weighing about 74lbs.

In the particular instance now to be cited, very distinct traces were left to shew the progress of aerolites through the air. During the explosion of a meteor near Bordeaux, on the 20th of August, 1789, a stone in diameter about fifteen inches, fell through the roof of a cottage, and killed a herdsman and some cattle. Part of this stone is now in the Greville Museum, and part in the Museum of Bordeaux.

On the 24th of July, 1790, between nine and ten at night, a shower of stones fell near Agen, in Guienne, near the south-west angle of France. First a luminous ball of fire

The way appropriate the attendance with grown and by and merica balance is a come or light which landed about little a country when after this a lead application may beard, and good to were covered the all the eller of more retire of many after full morel by the fall of comes, over a considerable satural of ground, and at various distances from such relige, I love were all alike to appreciation, but it many different slave, the executes mustber was three street two manner. June ment a rich doub more. Surer fall with a literary miles. and externed the ground; but it maller our transmed up the surface. The only dome to done by this chance of topes was, that they broke the likes of several houses, in falling on which they laid out the sound of hard and comuser substances, but of a restler in a suft half-inglifed state. Such as tell on straws adhered to them, and small ant becontily repare test to an about proof that they were in a

On the 15th of Docember, 1795, several persons, most the house of Captour Topham, in Yorkehire, heard a land source in the nic, followed by a luming sound, and soon effected check, as if a heavy body had follow to the ground as a little distance from them. To remitty, one or them was a large entire rell to the earth, at the distance of vegla or non-cardle from the plane where he stord. What he little decreased it, it was seven or eight yards above the grounding and in its full of three up the model on every side, burying made we may saw inches in the earth. This storm on been due on an append to wrigh while.

the the 17th of Merch, 17th, a heat, harden with an attending light, passed over the viriality of Ville Emerche, and the Emerican Levers, are respectively a lessing amount, and leaving heated a formation trank. This phe material coupling heated with a great many, about twelve handlend courtered to the splitting, will handlend courtering term observed to full to a morphism one the word, was traced. It was ment a few in channels, and in dispute

secularly travely his her best the ground.

On the 4th of July, 1969, a ball of fire streets a public house at Last Norton, in Oxformbure. There have very strong due to the free peoply mental the bridges status of the store, and the July at the contract of the popular and the during the contract of the people of employee.

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in contact with the house, exploded with great noise, and a very oppressive sulphureous smelt. Several furgments of stones were found on the spot, having a surface of a dark colour, and varnished as if in a state of fusion, with numerous globules of a whitish metal, combining sulphur and nickel. The indentures on these surfaces render it probable that the ball was soft when it descended; and it was obviously in a state of fusion, as the grass, &c. were burnt where the fragments, fell. The motion of the fire-ball, while in the air, was verticapid, and apparently parallel to the horizon.

The latest remarkable fall of aerolites in Europe, of which there is a distinct account, was in the vicinity of Laigle in Normandy, early in the afternoon of the 26th of April. 1812. A fiery globe of a very brilliant splendour, which. moved in the air with great rapidity, was followed in a few seconds by a violent explosion, which lasted five or six minutes, and was heard to the extent of more than thirty leagues in every direction. Three or four reports, like those of a cannon; were followed by a discharge resembling a fire of musquetry, after which a dreadful rumbling was heard, like the beating of a drum. The air was calm, and the sky serene, with the exception of a few clouds, such as are trequently observed. The noise proceeded from a small cloud of a rectangular form, the largest side being in a direction from east to west. It appeared motionless all the time the phenomenon lasted; but the vapour of which it was composed was projected momentarily from the different sides by the effect of the successive explosions. This cloud was about half a league to the north-north-east of the town of Laigle, and was at so great an elevation, that the inhabitants of two hamlets, a league distant from each other, saw it at the same time over their heads. In the whole canton over which this cloud hovered, a hissing noise, like that of a stone discharged from a sling, was heard; and a multitude of meteoric stones were seen to fall at the same time.

The district in which they fell forms an elliptical extent of about two leagues and a half in length, and nearly one in breadth; the greatest dimension being in a direction from south-east to north-west, forming a declination of about 22°. This direction, which the meteor must have followed, is exactly that of the magnetic meridian; which is a remark-

able result. The number of these stones was reckoned to exceed three thousand; and the largest of them weighed nearly 20lbs. They were friable some days after their fall, and smelt strongly of sulphur. They subsequently acquired the degree of hardness common to these stones.

While, in Europe, these phenomena thus strongly contirmed the long-exploded idea of the vulgar, that many of the luminous meteors observed in the atmosphere, are masses of ignited matter, an account of one of precisely the same description was received from the East Indies. On the 19th of December, 1798 at eight in the evening, a large fire-ball, or luminous meteor, was seen at Benares, and at several places in its vicinity. It was attended by a loud rumbling noise; and, about the same time, the inhabitants of Krakhut, fourteen miles from Benares, saw the light, heard what resembled a loud thunder-clap, and, immediately after, the noise of heavy bodies falling around them. Next morning the mould in the fields was found to have been turned up in many spots; and unusual stones of various sizes, but of the same substances, were picked out of the moist soil, generally from a depth of six inches. One stone fell through the roof of a hut, and buried itself in the earthern floor.

From these multiplied evidences it is proved that, in various parts of the world, luminous meteors have been seen moving through the air with surprising rapidity, in a direction more or less oblique, accompanied with a noise, commonly like the whizzing of cannon balls, followed by explosion, and the fall of hard, stony, or semi-metallic masseson a heated state. The constant whizzing sound; the fact of stones being found, similar to each other, but unlike all others in the vicinity, at the spots towards which the luminous body, or its fragments had been seen to move; the scattering or ploughing up of the soil at those spots, always in proportion to the size of the stones; the concussion of the neighbouring ground at the same time; and especially, the impinging of the stones on bodies somewhat above the earth, or lying loose on its surface, are circumstances perfectly well authenticated in these reports; proving that such meteors are usually inflamed hard masses, descending rapidly through the air to the carth.

AURORA BORBALIS, AND AURORA AUSTRALIS.

THESE splendid meteors are generally considered as the result of a combination of the two powers of magnetism and electricity. When the light, or aurora, appears chiefly in the north part of the heavens, it is called the AUBORA BOREALIS, Or NORTHERN LIGHTS; and when chiefly in the south part, the AURORA AUSTRALIS, or SOUTHERN LIGHTS. Where the auscation is more than ordinarily bright and streaming, which, however, selden occurs in the north, it is denominated LWMEN BOREALE; and where these streams have assumed a decided curvature, like that of the rainbow, they are distinguished by the name of LUMINOUS ARCHES.

The aurora is chiefly visible in the winter season, and in cold weather. It is usually of a reddish colour, inclining to yellow, and sends out irequent coruscations of pale light, which seem to rise from the horizon in a pyramidal, undulating form, shooting with great velocity up to the zenith. This meteor never appears near the equator; but of late years has frequently been seen towards the south

pole.

The aurora borealis has appeared at some periods more frequently than at others. This phenomenon was so rare in England, or so little regarded, that its appearance was not recorded in our annals between a remarkable one observed on the 14th of November, 1554, and a very briliant one on the 6th of March, 1716, and the two succeeding nights, but which was much strongest on the first night. Hence it may be inferred, that the state of either the air or earth, or perhaps of both, is not at all fines fitted for its production.

The extent of these appearences is surprisingly great. The very brilliant one referred to above was visible from the west of Ireland to the confines of Russia, and the east of Poland, extending over, at the least, thirty degrees of longitude, and, from about the fiftieth degree of latitude, over almost all the northern part of Europe. In every place, it exhibited, at the same time, the same wonderful features. The elevation of these lights is equally surprising: an aurora borealis which appeared on the 16th of

December, 1737, was ascertained, by a mean of thirty computations, to have an average height from the earth of

175 leagues, equal to 464 English miles.

Captain Cook, in his first voyage round the world, observes that these coruscations are frequently visible in southern latitudes. On the 16th of September, 1770, hewitnessed an appearance of this kind about 10 at night, consisting of a dull, reddish light, and extending about twenty degrees above the horizon. Its extent was very different at different times, but it mas never less than eight or ten points of the compass. Rays of light, of a brighter colour, passed through and without it; and these rays vanished and were renewed nearly in the same time as those in the aurora borealis, but had little or no vibration. body bore S. S. E. from the ship, and continued, without any diminution of its brightness, till twelve o'clock, when the observers retired. The ship was at this time within

the tropic of capricorn.

On the 17th of February, 1773, during his second voyage, Captain Cook speaks of a beautiful phenomenon that was observed in the heavens. "It consisted of long columns of a clear white light, shooting up from the horizon to the eastward, almost to the zenith, and spreading gradually over the whole southern parts of the sky. These columns even sometimes bent sideways at their upper extremity; and, although in most respects similar to the northern lights, (the aurora borealis of our henrisphere) yet differed from them in being always of a whitish colour; whereas ours assume various tints, especially those of a fiery and purple hue. The stars were sometimes hidden by, and sometimes faintly to be seen through the substance of these southern lights, aurora australis. The sky was generally clear when they appeared, and the air sharp and cold, the mercury in the thermometer standing at the freezing point; the ship being then in 58 degrees south." On six different nights of the following month (March) the same phenomenon was observed.

LUMEN BOREALE, OR STREAMING LIGHTS.

On the 8th of October, 1726, uncommon streams of light were exhibited in every part of the heavens, about eight o'clock in the evening. They were seen throughout England, as well as in the southern parts of Europe. They were mostly pointed, and of different lengths, assuming the appearance of flaming sphires or pyramids; some again were truncated, and reached but half way; while others had their points reaching up to the zenith, or near it, where they formed a sort of canopy, or thin cloud, sometimes red, sometimes brownish, sometimes blazing as if on fire, and sometimes emitting streams all around it. This canopy was manifestly formed by the matter carried up by the streaming on all parts of the horizon. It sometimes seemed to ascend with a force, as if impelled by the impetus of some explosive agent below; and this forcible ascent of the streaming matter gave a motion to the canopy, and sometimes a gyration, like that of a whirlwind. was manifestly caused by the streams striking the outer part of the canopy; but if they struck the canopy in the centre, all was then confusion. The vapours between the spires, or pyramids, were of a blood-red colour, which gave those parts of the atmosphere the appearance of blazing lances, and bloody-coloured pillars. There was also a strange commotion among the streams, as if some large cloud or other body was moving behind and disturbing them. In the northern and southern parts the streams were perpendicular to the horizon; but in the intermediate points they seemed to decline more or less in one way or the other; or rather to incline towards the meridian. Several persons declared that, in the time of the streaming, they heard a hissing, and in some places a crackling noise, like what is reported to be often heard in earthquakes.

At Naples, on the 16th of December, 1737, early in the evening, a light was observed in the north, as if the dir was on fire, and flashing. Its intenseness gradually increasing, about seven o'clock it spread to the westward. Its greatest height was about 65 degrees. Its extremities were unequally jagged and scattered, and followed the course of the westerly wind; so that for a few hours it spread considerably wider, yet without ever reaching the zenith. About eight o'clock, a very regular arch, of a parabolic figure, was seen to rise gently, to two degrees of rectangular elevation, and to twenty degrees of horizontal amplitude. At ten the intenseness of the colour disappeared; and by midnight not any traces of this phenome-

Hon were left. It was seen throughout Italy, as the subse-

quent accounts will show.

At Padua, on the appearance of this extraordinary meteor, the air was calm, and the barometer remarkably high. At five in the afternoon a blackish zone, with its upper limb of a sky-colour, appeared near the horizon: and above this zone was another, very luzzinous, resembling the dawn pretty far advanced. The highest zone was of a red fiery colour. A little after six o'clock, the upper parts of these zones emitted an abundance of red streamings, or rays; their vivid colour being occasionally intermixed with whitish and dark spots. In a few seconds after, there issued from the west, a red and very bright column, which ascended to the third part of the heavens, and which, a little after became curved like a rainbow. At half past eight, almost instantaneously, the bright zone, from eight degrees west to fifty degrees east, became more vivid, and rose higher; and above this appeared a new large one, of a red fiery colour, with several successive streamings tending upward, and exceeding sixty degrees of altitude; the western part having assumed the form of a thin cloud.— At midnight these splendid lights disappeared entirely.

At Bononia, this surprising meteor spread to such an extent as to occupy about one hundred and forty degrees of the heavens. Its light was so vivid that houses could be distinguished, at eight in the evening, at a very considerable distance; and these were so reddened, that many persons thought there was a fire in the neighbourhood. time the aurora formed itself into a concave arch towards the horizon; and in half an hour, at its eastern limit, a pyramid was displayed, of a more intense colour towards the north, from the centre of which there shot up vertically a streak of light, between a white and a yellow colour-A very dark narrow cloud crossed the whole phenomenon, and went to terminate in the pyramid. At the upper part, a very considerable tract of the heavens was enlightened by a very vivid red light, which was interrupted by several streaks or columns of a bright yellowish light. These streamings shot up vertically, and parallel to each other, the narrow cloud seeming to serve them as a basis. Under the cloud there issued forth two tails of a whitish light. hanging downward on a basis of a weak red, and seeming

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to kindle and dart the light downward. A white streak, which passed across these two tails, and extended from one end of the phenomenon to the other, in a position almost parallel to the above-mentioned cloud, gave a splendid effect to the whole. This surprising meteor disappeared a little after nine o'clock; but an abundance of falling stars were afterward seen in the south.

Similar observations were made at Rome; but in Great Britain, where this phenomenon was likewise seen, different appearances were displayed. At Edinburgh, at six in the evening, the sky appeared to be in flames. An arch of red light reached from the west, over the zenith, to the east, its northern border being tinged with a colour approaching to blue. This aurora did not first form in the north, as usually happens, and after forming an arch there, rise toward the zenith; neither did the light shiver, and spread itself, by sudden jerks, over the hemisphere, as is common; but gradually and gently stole along the face of the heavens, till it had covered the whole hemisphere: this alarmed the vulgar, and was indeed a strange sight. At Rosehill, in Sussex, it appeared as a strong and very steady light, nearly of the colour of red ochre. It did not dart or flash, but kept a steady course against the wind, which blew fresh from the south-west. It began in the north-north-west, in form of a pillar of light, at a quarter past six in the evening: in about ten minutes a fourth part of it divided from the rest, and never joined again. In ten minutes more it described an arch, but did not join at top; and at seven o'clock it formed a bow, disappearing soon after. It was lightest and reddest at the horizon, and gave as much light as a full moon.

LUMINOUS ARCHES.

In the month of March, 1774, a very beautiful luminous arch was seen at Buxton. It was white, inclining to yellow: and its breadth in the crown was apparently equal to that of the rainbow. As it approached the horizon, each leg of the arch became gradually broader. It was stationary and free from any sensible coruscations. Its direction was from north-east to south-west; and its crown or most

elevated part, not far from the zenith. This phenomenon lasted about half an hour.

The grandest spectacle of this kind which appears to have been seen in Great Britain, was observed at Leeds, in Yorkshire, on the 12th of April, 1783, between the hours of nine and ten at night. A broad arch of a bright pale vellow, and having an apparent breadth of about fifteen degrees, arose in the heavens, and passed considerably south of the zenith. Such was its varied density, that it appeared to consist of small columns of light, having a sensible motion. After about ten minutes innumerable bright coruscations shot out at right angles from its northern edge, elongating themselves more and more till they had nearly reached the northern horizon. As they descended, their extremities were tipped with an elegant crimson, such as is produced by the electric spark in an exhausted tube. After some time this beautiful northern light ceased to shoot, and, forming a range of bright yellow clouds. which extended horizontally about the fourth of a circle. its greatest portion, which darted from this arch towards the north, as well as the cloud-like and more stationary aurora, became so dense as to hide the stars from view. The moon was eleven days old, and shone brightly during this scene, but did not eclipse the splendour of these coruscations. The wind was in the north, a little inclined to the east.

A similar phenomenon was observed at Leeds on the 26th of the same month. From a mass, or broad column of light in the west, issued three luminous arches, each of which made a different angle with the horizon. They had not been viewed many minutes when they were rendered invisible by a general blaze of aurora borealis, which possessed the space just before occupied by these arches.

IGNEUS FATUI, OR MOCK-FIRES.

THESE meteors, denominated by the vulgar Will-with-anoisp, and Jack-with-a-lanthorn; and, at sea, or on the
coast, Mariners' lights, or St. Helmo's fires, are now
considered as real exhalations from the earth, produced by
gas, vapour, or some other attenuated substance, emanating
from vegetable, animal, or mineral materials, and com-

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bined with the matter of light or heat, or both. Instead of being dense or solid, they are uniformly rure and subtile; and, instead of originating in the loftiest regions of the atmosphere, or beyond its range, are generated for the greater part in low marshy plains or valleys. To the fearful and superstitious they are a source of as much terror as the nobler and sublimer meteors which have just been contemplated; and it is probable that they have occasionally been the source of real and extensive damage, when in a state of actual combustion; and that they have still more frequently seduced a timid and benighted traveller into dangerous bogs and quagmires.

In ITALY, in the BOLOGNESE TERRITORY, they are so frequent, in the morassy grounds, that they are to be seen every night, some of them affording as much light as a kindled torch, and others not being larger than the flame of a candle, but all of them so luminous as to shed a lustre on the surrounding objects. They are constantly in motion, but this motion is various and uncertain. They sometimes rise and at other times sink, occasionally disappearing of a sudden, and appearing again in an instant in some other They usually hover about six feet from the ground, differing both in figure and size, and spreading out and contracting themselves alternately. Sometimes they break to appearance into two parts, soon after uniting again in one body; and at intervals float like waves, letting fall portions of ignited matter, like sparks from a fire. They are more frequently observed in winter than in summer, and cast the strongest light in rainy and moist weather .--They are most friendly to the banks of brooks and rivers, and to morasses; but are likewise seen on elevated grounds, where they are, however, of a comparatively diminutive size.

In the month of March, 1728, a traveller being in a mountainous road, about ten miles south of Bononia, perceived, as he approached the river Riovedere, between eight and nine in the evening, a light shining very brightly on some stones which lay on the banks. It was elevated about two feet above them; its figure describing a parallelopid, more than a foot in length, and about six inches high, its longest side lying parallel to the horizon. Its light was so strong that he could distinguish by it very plainly a part of a neighbouring hedge, and the

bush red to a plantish online, and in diamond also bush red to a plantish online, and in diamond will prove the bush pales for about the always a control from ano, it was about that the bush, but and only the amount for the bush bush but and only the amount for the bush bush bush and only the animal formal and anomalism there is the following the control provided, which is a sum above. This light was not resulted, were according to the control provided of the control provided the control

On the 12th of frequency, 17th, severed days could figure their man discreted an observed day to frequence over, five only from Eigenrighton, a little before days to be A count many of these finite waves playing to an absence to be in different diperturns; then a more at which is seen to be in a guide and a surface of being, some closes or emitting the regulation of a makes, lifted with annually influent above, 10, in the same of the latter, the discharge in appearance to be upward, by veithed, maintain taking the mand discretion. The hedge, and the tree-on confinitely are estimated. The appearance conditions a second only, when the court plant of a better. The appearance we windless the appearance we will be appearance explanation were attended with any repair.

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In appear to this class of men as the men a continuous wife is returned to prove and other interest in the men of the men and the men and

appearance is that of an oblong, sometimes roundish, fiery body, with a long tail. It is entirely harmless, frequently sticking to the hands and clothes of the spectators, without doing them the least injury.

SPECTRE OF THE BROKEN.

This is one of those curious and interesting atmospherical phenomena, or deceptions, which proceed from one common cause, an irregularity in the tenuity of the atmospheric fluid. This fluid is commonly of an homogeneous, or equable tenuity, and consequently suffers the rays of the sun to penetrate it without any obstruction or change; but is at times irregular, and composed of parts of bodies of a denser medium than its general texture and constitution. Under these circumstances, the fluent ray, if it do not enter the denser medium in a direct or perpendicular line, will be either reflected, or refracted, or both; and the object surveyed through it, will assume a new, and, not unfrequently, a grotesque or highly magnified appearance.

The Spectre of the Broken is an aerial figure which is sometimes seen among the Hartz mountains in Hanover. This phenomenon has been witnessed by various travellers. and among them, by M. Haue, from whose relation the following particulars are extracted. "Having ascended the Broken (mountain) for the thirtieth time, I was at length so fortunate as to have the pleasure of seeing this phenomenon. The sun rose about four o'clock, and the atmosphere being quite serene towards the east, its rays could pass without any obstruction over the Heinrichshohe mountain. In the south-west, however, towards the mountain Achtermannshohe, a brisk west wind carried before it thin transparent vapours. About a quarter past four I looked round, to see whether the atmosphere would permit me to have a free prospect to the south-west, when I observed, at a very great distance towards the Achtermannshohe, a human figure of monstrous size! A violent gust of wind having almost carried away my hat, I clapped my hand to it; and in moving my hand towards my head, the colossal figure did the same.

"The pleasure which I felt at this discovery can hardly be described; for I had already walked many a weary

Dog in the larger of second this elections require, without turns alike to goodly my retinally. I tomer directs a rate another moreon in, by humatay my hady, and the cate of tigues house me repeated it. I will thereme ut share the come ones more, but my somewhat variablest. I remone only the there executive, adding to one whether it would be commanded in a low minutes it with made the appropriate on the Achterman diales. I then alled the bullend of the neighborn his hor, and I give both them the position which I but taken above, we looked towards the A. bio. mulashohe, but did not perceive ony thing. We had not, however, stead have, when two such coloured houses were turned over the show continues, which repeated their comcommunity by beauting then bodies as we did, after which they vanished. We returned our position, kept our ever fixed un the quat, and in a firth tigit the two fleures again stood before no, and were joined by a third." I that of a traveller who there exign up and prived the parry. Fivery convewould made by on these figures ignitioned; but with this diffto proce, that the playmanenan was sometimes weak and talne, wantermore arrange and well defined."

In Clarkin's "hanging of the Loken," a photometric character to that of the Apartic of the Backen, is recorded to bear being about a distributions of a distribution for Manufacture folls, a monotonic to Cranhanders. It resided much from our adapt and deep at the time, and expend to first oils of place on some first only and with a difficulty lines, and gray to reduce to the compound of different theory, and may be reduced to the compound of the first time, and may be reduced to the compound of the first time, and the first time and the first time.

The relation to so tillions.

Position I in the a mountain. I must half a mile up frederic, in them I in the north and many which by pre-fraction in his but even which have open in the west, and make it does no entirely. It the mean that is in the at does no entirely, in the mean that, a furner mad have point, writing as the dien, can the fluore of a more with a set, previous a most home, can the fluore of a more with a set, previous a most home, can the fluore of a more with a set, previous a most home, and extractly encoded in . They are presented in any of a very great got ", till does a read of the at the longer state of the Control Falling op me corpused that and but account and control the state has set the

mountain, in full expectation that they should find the man lying dead, being persuaded that the swiftness with which he ran must have killed him; and imagined also that they should pick up some of the shoes which they thought the horses must have lost, in galisping at so furious a rate. They were, however, disappointed, as not the least vestige of either man or horses appeared, not so much as the mark of a horse's hoof on the turf.

On the 23d of June of the following year, 1744, about half past seven in the evening, the same servant, then residing at Blakehills, at an equal distance from the mountain, being in a field in front of the farm-house, saw a troop of horsemen riding on Souter-Fell side in pretty close ranks, and at a brisk pace. Having observed them for some time he called out his young master, who before the spot was pointed out to him, discovered the aerial troopers; and this phenomenon was shortly after witnessed by the whole of the family. The visionary horsemenappeared to come from the lowest part of Souter-Fell, and were visible at a place called Knott: they then moved in regular troops along the side of the Fell, till they came opposite to Blakehills, when they went over the mountain. They thus described a kind of curvilinear path, and their first as well as their last appearance, was bounded by the foot of the mountain. Their pace was that of a regular swift walk; and they were seen for upwards of two hours, when darkness intervened. Several troops were seen in succession, and frequently the last, or last but one in the troop, would quit his position, gallop to the front, and then observe the same pace with the others. The same change was visible to all the spectators; and the sight of this phenomenon was not confined to Blakehills, but was witnessed by the inhabitants of the cottages within a mile. It was attested before a magistrate by the two above-cited individuals in the month of July, 1785. Twenty-six persons are said in the attestation to have witnessed the march of these aerial travellers.

It should be remarked that these appearances were observed on the eve of the rebellion, when troops of horsemen might be privately exercising; and as the imitative powers of the Spectre of the Broken demonstrate that the actions of human beings are sometimes pictured in the

that all more highly probable, one a communication of the action plantomers and therefore plantometers as absence with the action of the later plantometers as absence with the action of the appearance were descent. It is also probable that there expends many have been appearant and action to also be absolute that there expends many have been appearant of a the standard plantomers which are also become that the first of the action of

THE WINAME.

There ever existing pleasant one, which was remarked to al. Moreov, one of the Francis execute belonging in the fractions of large, in the last not assert density denset becomes classification and that one, is the last not become dense to the execution as a median of the execution as a median of the execution as a median of the execution of the execution of the execution of the plant of the plant of the plant of the execution of the plant of the execution of th

the unit backs, in his housestine trained introduces the tallions of amounted description of the proconstances " There fact the obligation I that an produce were to my water, used, redflere out for therester, no some to receive the street, auguments like an income at condition fution and firmer of to nature than before "The Arelo, attractive than with putteral language, and chatterne for the sale of our comes a world some of them a disp. that I threat the an proour and its denotes and so note, apparent, up a the comme after each of an immunion law of one foot occord will the profounding of his factorises in man threat . But having HE sale and indeed, at the tipes, and denote as to the cortically and the feeling treatment and security the full manager of a figureings of Rossia with all its grows or law and or in me, 2. postratly railprisal by it as by a more more chiller er you the manufact thread of the probable (per , so ! .) One some might have been thene perjudicity it appeter to the A total to be influenced by when in come we were to pres the The the marganist things to bush on the ord to could to have been informed at with a nicensupress . . .

more, Extragal

as fully convinced as any of us that we were drawing near to the water's edge, and became indignant, when the Arabs maintained, that within an hour we should reach Rosetta, by crossing the sands in the direct line we then pursued. and that there was no water, 'What,' said he, giving way to his impatience, do you suppose me an ideot, to be persuaded contrary to the evidence of my senses? The Arabs, smiling, soon pacified him, and completely astonished the whole party, by desiring us to look back at the desert we had already passed, where we beheld a precisely similar appearance. It was, in fact, the mirage, a prodigy to which every one of us were then strangers, although it afterwards became more familiar. Yet upon no future occasion did we ever behold this extraordinary illusion so marvellously displayed. The view of it afforded us ideas of the horrible despondency to which travellers must sometimes be exposed, who, in traversing the interminable desert, destitute of water, and perishing with thirst, have sometimes this deceitful prospect before their eves."

This appearance is often seen, when the sun shines, upon the extensive flat sand upon the shores of the Bristol channel, in Somersetshire, and probably on the sea-shore in other parts of England; the cause is, we believe, the

evaporation of water.

FATA MORGANA.

As when a shepherd of the hebride isles
Placed far amid the melancholy main,
(Whether it be lone fancy him beguiles,
Or that aerial beings sometimes deign
To stand, embodied, to our senses plain)
Sees on the naked hill, or valley low,
The whilst in ocean Phœbus dips his wain,
A vast assemblage moving to and fro;
Then all at once in air dissolves the wondrous show.

THOMSON.

THESE optical appearances of figures in the sea and air, in the Faro of Messina, are the great delight of the populace, who, whenever the vision is displayed, run about the streets shouting for joy, and calling on every one to partake of the glorious sight. To produce this pleasing deception, many circumstances must concur which are not

active to other in may rele- artificiant. The operations open stone with the first to the cost, to wrote elegated place heland she cay, that he may command a sum of the the whole hav, beyond which the countries of Mesons rice like a wall, on I dorden the back commit of the pletting. The winds more to bushed, the surrece quite outgowing), the elde of its torothic and the waters presented up by a consouls to a proof oferallon in the middle of the burner! All times or at eximinators, as some as the our minerates the control little behind the pine for the California ount approached and river libral estern to the teacher was un- in ad finitytive the come on the water termer the else, ever cohiner, eq-Lating or neuring or Erupto, will be presented a theoremstrole in that marries looking glams, which, hy its tremodons mortime, to, as it were, can late freety, but to be well given rapidly oil in maccontun, as the day advances, and the tream curies down the wave on which it appropries. Claus the parts of this arosing photos will remain on the twitishing of no eye. Homestimes the sir is of that time so happenenged with vapones, and undimeded by winds, so no coffees objects in a blod of nortal corresu, come also it things feet where the level of the one. In a budy, lowery weather, they are drawn on the oursare of the water, less-Deposit with him promoute achiere

Emintures, in his travels, time Failur Appeline? to having here the first to describe this phenomenon occuencely. The column is as hillows. "Un the 15th of Au-

1619, as I stood at my window, I was supprised while met arouterful and adjectable volum. The are which then the Stelling show a writed up, and harmon, for I in less in hearth, like a cluster of Jank missioning while directive their mit Calabries mant grow again amount, and an instant depends of a une published masses, while the constant of present the observation of means flowering of light and appropriately appropriately and equal in altitude, all masses and depends of light and heart. In a minimum they less helf they heare of light and heart. In a minimum they less helf they heare a less thanks, the permitty about These are publications and the second on the sap, and shows to me much a minimum.



trees, even and similar. This was the Fata Margane, which, for twenty-six years, I had thought a mere fable.

ATMOSPHERICAL EXPRACTION.

A suppression instance of atmospherical refraction occarried at Hastings on the 25th of July, 1798. W. Latham, Esq. F. R. S. sitting in his dining room, situated on the parade, close to the sea-shore, and nearly fronting that south, about five in the afternoon, had be attention sub-dealy drawn by a great number of people causing down to the sea-side. On coupling the reason, he was informad that the coast of Erance was plainly to be distinguished by the naked eye. On going down to the shore, he was surprised to find that, even without the assistance of a telescope, he could very plainly see the cliffs on the opposite coast; which, at the nearest part, are between forty and nity miles distant, and are not to be discerned, from that low situation, by the aid of the best glasses. They sereared to be only a few miles off, and seemed to extend for nome leagues along the cuast. Pureaing his walk along he shore to the eastward, close to the water's edge, and duversing on the subject with the sailors and usbermen, hey could not, at first, he persuaded of the reality of the ppearance; but soon became so thoroughly convinced, by he chile gradually appearing more elevated, and approachng nearer as it were, that they pointed out, and named to lies the different places they had been accustomed to a what the Bay, the Old Head or Man, the Windmill. Roulague; together with St. Vadery, and other plan in the coast of Figurely. This they offerwards confirmed, "a upas, observing that the above places appeared as away is if they but been suiling, at a small distance, tota the

reference.

From the eastern cliff, which is of a very considerable height, a most to outful severe presented itself to Mr. Laffants view, for there he could at once see those message funcer Cliffs, and the French coast, all plong from Collacs, one, are to St. Vallery; and, as some of the select direct, as for bothe weatward even as biespect at telescope, the French forbing basis series plately.

er to term at minima, must the Officeral Colored of the land of the land of the landscape, with the landscape, were perfectly that are mile. The extrema phonomerous continued to the landscape already with the proof of the landscape is took about the count time smally elemented the face of the case to their triples is proofed. In the country of a second on the landscape of appropriete in relaxation and make large particular of the country of the country

THE SHEET TO LAND STORE STORE

The the left of Californity, 107 L, near Officending to Price. was the sky erecty who to wrome, they sun, which was well some degrees showe the historia, was were to have not only born and will be my charge or little door a comment. the regard, personathuranding is also with great to me. Hannath thin planes, research the landers, there have t common has affine smoull chind, at the function part at actuals there appeared a most and to the same appeared to with the two man and of a name whose red sodour. the print and desconding emploidly to the language, to a rate at the santoline, and just on the confer today before in control in it was approximated by the contine its air - and Wer larger, we brought possent bops the longer 1 , 15 mo, and then remained above. This aboves They are a moute out the other contraction of the brancher. complete to the tent of the tent of the party of the tent of with the mostly and me to mention the relient, nightly me from their about to have be apply to use the corne excellent the fail, and up to the ground can, at a line manner of the contract of the ball the particle on a report that I have appreciately only could belliage the an exceedings a haven best which have till the " och at Storely on Washing they lead from the flower than some of Principle in

Christia contras August, 197, a cleant sixtin a attach an the

pearance of three suns, which were then extremely brilliant. Beneath a dark, watery cloud, in the east, nearly at its centre, the true sun shone with such strong beams, that the spectators could not look at it; and on each side were the reflections. Much of the firmament was elsewhere of an azure colour. The circles were not coloured like the rainbow, but white; and there was also, at the same time, higher in the firmament, and towards the south, at a considerable distance from the other phenomena, the form of a half moon, but apparently of double the size, with the horns turned upward. This appearance was within of a fiery red colour, imitating that of the rainbow. These phenomena faded gradually, after having continued about two hours.

Two mock suns, an arc of a rainbow inverted, and a halo, were seen at Lyndon, in the county of Rutland, on the 22d of October, 1621, at eleven in the morning. There had been an aurora borealis the preceding night, with the wind at west-south-west. The two parhelia, or mock suns, were bright and distinct, and in the usual places, namely, in the two intersections of a strong and large portion of a halo, with an imaginary circle parallel to the horizon, passing through the true sun. Each parhelion had its tail of a white colour, and in direct opposition to the true sun; that towards the east being 20 degrees or 25 degrees long. and that towards the west 10° or 12°, both narrowest at the remote ends. The mock suns were evidently red towards the sun, but pale or whitish at the opposite sides as was the halo also. Still higher in the heavens, was anen of a curiously inverted rainbow, about the mile of the distance between the top of the halo and the vertex. This arc was as distinct in its colours as the common rainbow, and of the same breadth. The red colour was on the convex, and the blue on the concave of the arc, which seemed to be about 90° in length, its centre being in or near the vertex.. On the top of the halo was a kind of inverted This phenomenon was seen on the following bright arc. day, and, again, on the 26th. On the 11th of the preceding month, September, a very splendid and remarkable aurora borealis, presenting truly unaccountable motions and removals, was witnessed at Rutlandshire, in Northhamptonshire, and at Bath.

LOWAR DARRION

The way has philippined the withough of Cilerani) Bull, in Dornychare, on the 25th of December, 1740. identi while he the evening, with a seminekatile and eary no. round thoulast of column. The muon had present her full about thompstime ficure, and the evening had been eating; but the clouds were dispersed, and the moon their danger preses clear. This less binarie had all the colours of the solve lyla, exceedingly beautiful and distinct, only faint in comparison with those which are seen in the day a seement precionally have been the case, buth from the different beams by which'it was organished, and the disposition of the medium. What most supproved the observer was the hargement of the are, which was not on much beathau that of the sun, so the different dimensions of their budies, and their expective distances from the earth, seemed to require and the matternes and beauty of its colours furnished o

COMMITTED RAINFOWS.

The exmoptionry phonomenes, which is seen at some and the Conditions of the Andre, in South America, was tiret warmened by Ullis and his compagions in the while the sales of Panissinarce, and is that described by limit. At day-legal the whole of the magnitain was enveloped on in items almyle, which at min-size were dissignated, leavethe television the invaginate of an extreme a televity as not to " he during and alibe to the with. At the ride occupie to " that where the cun rose outlie mountain, and at the dis-" to concern about only yards from the same whom we were " equilibring the mange of each of the was some equipmental, o as if in a morm, there enaceatric raintows, the last, or a most exterior estaure of not of which our fort the first " of the following our, Indag ventered to the brack. With and the white of them, and at an in-midwalds tracked, " was seen a famile up paraly white "Flory area at " programmentes to the lambers, and to projection or one to once in to operat from the olde to the other, he was as to companied by the phononement, which preserves the

"same order and disposition. What was however, most remarkable, was this, that although six or seven persons were thus standing close together, each of us, saw the phenomenon as it regarded himself, but did not perceive it in the others. This, adds Bouguer, is a kind of apothesis, in which each of the spectators, seeing his head adorned with a glory formed of three or four concentric "crowns of a very vivid colour, each of them presenting varieties similar to those of the first raisbow, tranquilly enjoys the sensible pleasure of reflecting that the brilliant garland he cannot discover in the others is destined for himself alone."

A similar phenomenon is described by Mr. Hagarth. F. R. S. as having been seen by him on the 13th of February, 1780. His relation is as follows. "In ascending, at Rhealt, the mountain which forms the eastern boundary of the vale of Clwyd (in Denbigshire) I observed a rare and curious phenomenon. In the road above me, I was atruck with the peculiar appearance of a very white shining cloud, which lay remarkably close to the ground.-The sun was near setting, but shone extremely bright: I walked up to the cloud, and my shadow was projected into it, its superior part being surrounded, at some distance, by a circle of various colours, whose centre appeared to be near the situation of the eye, and whose circumference extended to the shoulders. This circle was complete, except what the shadow of my body intercepted. It exhibited the most vivid colours, the red being outermost, all of them appearing in the same order and proportion as they are presented to the view by the rainbow. It resembled very exactly what in pictures is termed A OLORY, surrounding the heads of saints: not indeed that it exhibited the luminous radiance that is painted close to the head, but an arch of concentric colours placed separately and distinctly from it. As I walked forward, this glory approached or retired, just as the inequality of the ground shortened or lengthened my shadow. The cloud being sometimes in a small valley below me, sometimes on the same level, or on higher ground, the variation of the shadow and glory became extremely striking and singular. To add to the beauty of the scene, there appeared, at a considerable distance, to the right and left, the arches of a white shining

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THE WHITE AND LIMITAGE

The re-most of the party white on sailuresand?

fange.

I must have been a fit flower, and Strains not a

finanger as

To more justly of the ration of thouse and lightmore we have only to view the effects of a common chigara collandidar, and its apparetus, in his apartment. There we personents mount the gives, remaineful, and to restic plantenand all nature. The almain, or opents, from the mar frees to the fraud, expressed the shall of lightning from the clouds we then earth , and the anappaing galor of the diminutive mak corresponds with the explosion produced by the shall of hightness which we call therefore. In what manner the lands become electrified, and, to short, what is the nature of electricity froll, our present range of experiments w little quality in in determine, that a century will contain staped before a philosophical precision can be attained -At present we only know for certain that the electrical money displays used merely as the surface of healing and selection it is a float per se, a current enduring treelf, in where or its intime may be, the state of experimental from he the descript enable us to determine.

The obvious analogy between lighteding his bidesering lead loop from compacted, and note phase to some a gradual by Doctor Frenkling who were the first to some one the gradual to Doctor Frenkling who were the first to some one the product of ability of descripting denset lightens, from the doctor fresh loop from the first provided in attended by parties, in apprehension that lighteening model between passers the amount of the course gradual to the latter would be that the course of industrial less above to an automation slagerer. A latter of industrial less above to an automation suggests a some less and wavefunctions are also at the latter opening a sound of the one formation departs of an automatic description of the loop of the latter opening at any of the parties of the latter opening at any of the parties of the latter opening at any of the parties of the latter opening at any of the parties of the latter opening at any of the parties of the latter opening at any of the parties of the latter opening at any of the parties of the latter opening at latter opening at

disposed in an irregular manner, always exhibits the same

appearance.

Lightning strikes the highest and most pointed objects in its way, in preference to others, as high hills, trees, spires, masts, &c; and all pointed conductors receive and throw off the electric fluid more readily than those which are terminated by flat surfaces. Lightning is observed to take the best and readiest conductor; and this is also the case with electricity, in the discharge of the Leyden phial; whence-Doctor Franklin inferred that, in a thunder-storm, it would be safer for a person to have his clothes wet than dry. Lightning burns, dissolves metals, rends some particular bodies, such as the roots and branches of trees, strikes persons with blindness, destroys animal life, deprives magnets of their virtue, and reverses their poles; and these are the well known properties of electricity.

Lightning not only gives polarity to the magnetic needle, but to all bodies which have any portion of iron in them, as brick, esc; and, by observing which way the poles of these bodies lie, the direction in which the stroke has pass-

ed may be known with the utmost certainty.

In order to demonstrate, by actual experiment, the identity of the electric fluid with the mattter of lightning. Doctor Franklin contrived to bring lightning from the heavens by means of an electrical kite, which he raised on the approach of a thunder storm; and, with the electricity thus obtained, charged phials, kindled spirits, and performed all other electrical experiments, as they are usually exhibited by an excited globe or tube. This happened in 1752. a month after the French electricians, pursuing the method which he had proposed, had verified the same theory; but without any knowledge on his part of what they had done. On the following year, he further discovered that the air is sometimes electrified positively, and sometimes negatively; and that, in the course of one thunder-storm, the clouds change from positive to negative electricity several times. He was not long in perceiving that this important discovemy was capable of being applied to practical use; and proposed a method, which he soon accomplished, of securing buildings from being damaged by lightning, by means of conductors, the use of which is now universally known.

. From a number of judicious experiments made by him,

comme florences where bother that the Louds were to make the to contay the desters thild from these posts to the which which are were bounded with it, to those where it is released. The came case by which a cloud is Arci moule from dayment disposed in atmosphere, dipose we I there with the aler ofly formed, and sell continues to form new ones, till the whole collected muse essent on the so to reach a part of the earth where there to a defictance of the electric fluid, and where the electric ments will die charge need on the partie. A channel of communicating bule: thus produced, a fresh supply of electric matter in cased from the overloaded part, which continues to be convered by the medium of the clouds, till the equilibrium of the third is restored between the two places of the corththe facther observes that as the wind constantly blance from the place where the thunder cloud proceeds, the midden accomplation of such a prodigious quantity of vapours must mentage the cir, and repel it on all states. Indeed, many about sations of the descent of lightning confirm his the my of the mode of its ascent ; for it after throne before it the pure of conducting bodies, and distributes them chang the reations mistanti through which it must force its passage; and on this principle the langues thashes at lightness was in he produced, by its foreign in its way part of the various in the air. One of the cloud residual why the require of them. studies is an inacle protesorted, is the vant laugule of the carmin mode by the parage of the deffice maters for discords the art callapses the margent after it has present. and the vibration, on which the onind dispends, community at the came moment, will, when the that is directed to much the person who home the request, the vilentrope of sheet at the nearest emit of the truck will searly him par county comor than these from the remain and that a man will, authors any ratio in experiencein, consions all all the reberoto que have come code ly come by I have "The contine conten of the thursday, which makes it made and it present the to willow do porro smanly braken, a grantely many in the sound having conited among clouds have my over wer worthis, and the aglewed are province to salesty between them.

Assumption proceeding proceedings to be found to the form of the process of the p

few yards of a tree, but not quite near it. Signor Beccaria, however, cantions persons not to depend on a higher, or. in all cases, a better conductor than their own body; since, according to his repeated observations, the lightning by no means descends in one undivided track, but bodies of various kinds conduct their share of it at the same time, in proportion to their quantity and conducting power. late earl Stanhope, in his principles of Electricity, observes that damage may be done by lightning, not only by the main stroke and lateral explosion, but likewise by what he calls THE RETURNING STROKE; that is, by the sudden violent return of that part of the natural share of electricity of any conducting body, or any combination of conducting bodies, which had been gradually expelled from such body or bodies respectively, by the superinduced elastic electrical pressure of a thunder-cloud's electrical atmospheres.

Among the awful phenomena of nature, none have excited more terror than thunder and lightning. It is recorded of several of the profligate Roman Emperors, who had procured themselves to be deified, that when they heard the thunder, they tremblingly concealed themselves, acknowledging a divine power greater than their own—a Jupiter

thundering in the heavens.

REMARKABLE THUNDER-STORMS.

A rew instances in which the effects of these storms have been particularly characterised, will be both interest-

ing and instructive.

That fermented liquers are apt to be soured and spoiled by thunder, is a fact well known; but that dried substances should be so acted on, is a still more remarkable phenomenon, and not so easy of explanation. It happened, however, some years ago, that in the immense granaries of pawrzic, the repositories of the corn, of Polish growth, intended for exportation, the wheat and rye, which were before dry and sweet, were, by the effect of a violent thunseler-storm in the flight, rendered clammy and stinking, insomuch that it required several weeks to sweeten them and render them fit for shipping.

The effects of a thunder-storm on a house and its furniture, at New Fonge, Ireland, on the 9th of August, 1707, were very singular. It was observed that the day



was throughout them, but, and outry, with marriedy any wind, mile two our time a could, which is because a since one will, arroting or by, which land about an hour. As the all decisions after our or, enveral tains dustrie of lights ning a re area and chamber chaps bount, as as a distance. hat makers can and eleven well-b they became, in then approach, very violent and terrible, progressively anches no in their memory, and conting on with non-livelumes with suwands maintaile. A finds of lightning, and chap of those doe, langer and more described thought the rest, come simularanemaly, and shook and inflamed the whole house. The matres being crastile at that hetual of a strong calabareduce smell in her chamber, and technic a thick providers tall on her hague and face so she lay in hed, concluded that part of her house had been thrown down by the thursday, or we on the by the lightning. The lamily being called up. and condes lighted, both the bed-chamber, and the birches. beneath it, were found to be filled with smake and dues. A londing what is the character had been booken with such violence, that not a piece of it was to be found of the use al half a crown : several of the pieces were shock in the chamber door, which was of oak, as well as on the other wide of the runn. The suger and corners of sums of the many of broken sime ocre ineced of a light flame colour, as if they had been treated by the fire.

We the following immunity is was found that the corners. of the element and the beilefurner had been wreet of. and a hyperh twenty in her in herality, made in the wall As this pair there was took in the wall a contled was in trace, as a left by the smoke of a south, which mounted disagrand to amother past of the wall, where a coultier towards was made. Within the chariton, the boards on thereton & of a boye han truck, filled with lange a manage-1 in two thirds of the lines were payend as ear thom h. the in approximent a quadrangular frage. Enveral por to a information and wearing appears to which beyon the country, wore disperson dues the count, and an air any on god in prior had, over a silenamiliar the hair in the back of the more, where the term h was stode, was signed. In the timber, in all was found that, will the long a married on in a marrier proceedings, without was office ours, or towns later, granted that the fer was curew a little away the raining.

In the parish of Sampord-Courtney, near Oakhampton, in Devon, on the 7th of October, 1811, about three in the afternoon, a sudden darkness came on. Several persons being in the church-porch, a great fire-ball fell among them, and threw them down in various directions, but without any one being hurt. The ringers in the belfry declared that they never knew the bells go so heavy, and were obliged to desist ringing. Looking down from the belfry into the church, they perceived four fire-balls, which suddenly burst, and the church was filled with fire and smoke. One of the congregation received a blow in the neck, which caused him to bleed both at nose and mouth. He observed the fire and smoke to ascend to the tower, where a large beam, on which one of the bells was hung, was broken, and the gudgeon breaking, the bell fell to the floor. One of the pinnacles of the tower, next the town, was carried away, and several of the stones were found uear a barn, at a considerable distance from the church.

On the 15th of December, 1754, a vast body of lightning fell on the great hulk at Plymouth. It burst out a mile or two to the westward of the hulk, and rushed towards it with incredible velocity. A portion of the derrick (a part of the apparatus which serves to hoist in and fix the masts of the men of war) was cut out, of a diameter of at least eighteen inches, and about fifteen feet in length: this particular piece was in three or four places girt with iron hoops, about two inches broad, and half an inch thick, which were completely cut in two by the lightning, as if done by the nicest hand and instrument. The lightning was immediately succeeded by a dreadful peal of thunder, and that by a most violent shower of hail, the hail-stones being as large as nutmegs, and for the greatest part of the same size and shape.

Among the many fatal accidents by lightning which have befallen ships, the following is a remarkable instance. In the year, 1746, a Dutch ship lay in the road of Batavia, and was preparing to depart for Bengal. The afternoon was culm, and towards evening the sails were loosed, to take advantage of the wind which then constantly blows from the land. A black cloud gathered over the hills, and was brought by the wind towards the ship, which it had no sooner reached, than a clap of thunder burst from it.

and the Melitting set fire to the melit-toperail . Her house very day, horned with gross here; and thus the capange and mand were art on time. An attempt was formediately much in our away flee man, but this was in evented by the fulling of the linear electing from the land of the man by the erges the his remarkabled to the other mans, and obligod the crew to desire the slope the built of which array. wards took hee, aint, founding drawn to the powerter may never to the property of the contract due, the upper part was blown tale the air, and the lower part ours when the ship was at anchor.

In cooms the Atlantic, in the month of November, 17 art, the cross of an Unwhat ship others road a larger touth at blue fire colling me the water. It come down on there we test, that before they could raise the main tack, they always ved the half to cive almost perpendicularly, and willian a they you and the mainteleanner is went off with an eaglishing as it handreds of remain had been fred off amountained; and left belond it a great and I of between The realisinge-most was challered into a thinescal pierce, and apthes storyon rast of the mariement which struck in the main dock, tive wear a were knocked down, and one of their greatly. terrate by the explosion. The fire-ball was of the rooms cont one of a large milleriote, and cause from the N. E.

The Ingenous and intelliginate Professor Richmon tou he life on the fitte of August, 1779, as he was observing, with M. Sukolim, outparer to the Royal Academy of St. Potersburgh, the effects of electricity on his groupou, durung a thunder-storm. It me accertained that the lightnine true more particularly directed use the professor's approximately the openin of his electrical apparatus, for M. Sakolow distinctly new a globe of blue bre, or large as his clenched hand, pump from the rod of the right enamon. towards the feedbead of Professor Rielman, who at slow mation was about a host distinct from the god, abserving the obstrand males. I'm globe of life which now the Confessor, was attended with a regard no lovel do that of a metal. The nouse of such after was broken to pure your to transmitte themen on M. "white is taken on when a proper maybe of the leakhannance many life. That of the they treed was landery of, and the assisting tellings to comthe December of the man the man the stands of the the were at the lightning was endeated in this r sir own who is

touched the filings of metal in the glass vessel. On examining the effects of the lightning in the Professor's chamber, the door-case was found split half through, and the door torn off, and thrown into the chamber. The lightning therefore seems to have continued its coarse along the chain

conducted under the ceiling of the apartment.

In a Latin treatise, published by M. Lomonosow, member of the Royal Academy of Sciences of St. Petersburgh, several curious particulars are mentioned relative to this melancholy catastrophe. At the time of his death, Professor Richman had in his left coat-pocket seventy silver coins, called rubles, which were not in the least altered by the accident which befel him. His clock, which stood in the corner of the next room, between an open window and the door, was stopped; and the ashes from the hearth thrown about the apartment. Many persons without doors declared that they actually saw the lightning shoot from the cloud to the Professor's apparatus at the top of his house. The author in speaking of the phenomena of electricity, observes that he once saw during a storm of thunder and lightning, brushes of electrical fire, with a hissing poise, communicate between the iron rod of his apparatus and the side of his window, and that these were three feet in length, and a toot in breadth.

HAIL STORMS.

On the 17th of July, 1666, a violent storm of hail fell on the coasts of Norfolk and Suffolk. At North Yarmouth the hail-stones were comparitively small; but at Snape-bridge one was taken up which measured a foot in circumference; at Seckford Hall, one which measured nine inches; and at Melton, one measuring eight inches. At Friston Hall, one of these hail-stones, being put into a balance, weighed two ounces and a half. At Aldborough, it was affirmed that several of them were as large as turkies' eggs. A carter had his head broken by them through a stiff felt hat: in some places it bled, and in others tumours arose: the horses were so pelted that they hurried away his cart beyond all command. The hail-stones were white, smooth without, and shining within.

On the 25th of May, 1686, the city of Lille, in Flanders, was visited by a tremendous hail storm. The huil-stones

request from a spectry of a populate a ground weight, and even mines. One among the cost was observed in a automatable over the over the law observed in the life grows when both appears Officers were tensor parent, and wellest matently between the fire. This elementaries were the city and country, between the fire. The second of the observed over the city and country, and only if the recovered over the city and country the law of the law were broken, and occasionated down, and postfulges and layer billed in about tensors.

In 1847, a hopered black cloud, arrangled with framewall lightning and thumber, coursed with a wouth-west world and of Carn't complaint, and paraling time Manualan, was the presencer at a most transportant half-storm. In the pers at Durdagshire localising on the con, all the windows on the weather only were hanken by the ball-stance the harged from this cloud, and the mailey and known, research that with a large mostle, killed. In the worth part of I limping arver of process that their houds tracken and were grierously browed in their limbs. The main body of this hall storm fell on Lane-solure, to a right line from Growkirk in Blackburn, in the handers of Yorkshire. The brough ed the chiral was along two miles, within which conquere it and incredible damage, killing all decorptions at real and mail receiptors, and converts heaving a whole pour in plan in any of the windows where it percent. What man atill account it gilencyland are the exectly, and out off the telester of the grown curry or is attacky to destroy it, the hall-states company planting two in the principal. The me hall cotomer, and of a help related necessaries, were at dilbert tarms, and round, where entireplantially community interpretations. ad and generalized, ther the fact of a fletching plan, those, acing year management band band; but a conception being balant in the make at most of them, if out is all. The him etithen fall discort that they descended from a error langely. What not thingle to be west saftweetings in the plant commission, that the value who is disposed it as a preprocess that the entered, already have combined median on t the on hour a trace or unwork of signs inflow, and abundle mining this attentive powers, here is separat an office. - to or a regulation material factor of the Callet a came, as in the removation had around in an exact climb of the first

On the 4th of May, 1767, at Hitchin in Hertfordshire, after a violent thunder-storm, a black cloud suddenly arose in the south-west, about two o'clock in the afternoon, the wind then blowing strongly in the east, and was almost instantly followed by a shower of hail, several of the hailstones which fell measuring from seven or eight to thirteen or fourteen inches in diameter. The extremity of the storm fell near Offley, where a young man was killed, and one of his eyes were beaten out of his head, his body being in every part covered with bruises. Another person. nearer to Offley, escaped with his life, but was much bruised. At a nobleman's seat in the vicinity, seven thousand squares of glass were broken, and great damage was done to all the neighbouring houses. The large hail stones fell in such immense quantities, that they tore up the ground, and split many large oaks and other trees, cutting down extensive fields of rye, and destroying several hundred acres of wheat, barley, &c. Their figures were various, some being oval, others round, others pointed, and others again flat.

HURRICANES.

THE ruin and desolation accompanying a hurricane can scarcely be described. Like fire, its resistless force rapidly consumes every thing in its track. It is generally preceded by an awful stillness of the elements, and a closeness and mistiness in the atmosphere, which make the sun appear red, and the stars of more than an ordinary magnitude. But a dreadful reverse succeeding, the sky is suddenly overcast and wild; The sea rises at once from a profound calm into mountains; the wind rages and roars like the noise of . cannon; the rain descends in a deluge; a dismal obscurity envelopes the earth with darkness; and the superior regions appear rent with lightning and thunder. The earth, on these occasions, often does, and always seems to tremble, while terror and consternation distract all nature: birds are carried from the woods into the ocean; and those whose element is the sea, fly for refuge on hand. The affrighted animals in the fields assemble together, and are almost suffocated by the intertuosity of the wind, in searching for shelter, which, when found, serves them only for destruc-

up. The mote of houses my rected to vale distance from their walts, which are beares to the ground, burying their mounted law ath them. Large trees are turn up by the cooks. and huge bean her abigumal off, and driven through the are pareces & direction, with famous valuence. A very greened June that withstands the slowch, is amount of its language and forlage. Plants and grown are laid that to the earth. Luxurum aprion to io a number changed to desiry where. This illustral traggedy couled, when it happens in a fame. the department to amore your eight occumulated in more. Her imphase is covered with reports of boots and second; and the shore has not a seather of its former time remaining. Alpenels of robbiels and rossers in one piece; from at each and tennia of trees in anothers done guilter from commone of wovers and the dead and dying bodies of most, rement, and children, built learnet, and secured about, where streets but is few house believe ween, present to the minerally during animaling conclusion of a operation to be followed by families, and, when accompanied by see carthomics, by mortal discusses.

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On the Indian coast Intricours are both frequent and disagram the the plat Orgalier, 17 th, the French squak you, communically by Rounfound, bulge at author to Madyna marja, a fauricana como un which in a few house desurvey nearly the whole of the fines, together with sweary other slape belonging to different untions. One of the Arenete obliga townstered to an instant, and only signification new more enved. On the 30th of Dec. 1760, during the were at Panderberry, a treamadont buttecame diare on shine, and neighed, three British there belonging to the there your equations the store were sevent. Until sinked chitober of the fullowing year, 1701, the British for a, then lying in Multiportants, had to containting a violent huntry Sunc. The mem of was put to new, and never thus provided mally covered; but all the exceeds militar entlikes ut another grape long, and readingly a soul on front accord. I before with of themselves the common hardware was no the court of Commercial, hand to the tilesthose besterning, which me tentral to put to men

In the West Indies, the late tremendous hurricane of the 21st of October, 1817, was particularly severe at the Island of St. Lucie. All the vessels in the port were entirely lost. The Government-house was blown down, and all within its walls, comprising the Governor, his lady, and child, his staff, secretaries, servants, &c. amounting to about thirty persons buried in its ruins: not one survived the dreadful accident; and still more horrid to relate, the barracks of the officers and soldiers were demolished, and all within them (about two hundred persons) lost. All the estates on the island were reduced to a heap of ashes. At Dominica, nearly the whole of the town was inundated, with an immense destruction of property.

In Great Britain, a dreadful hurricane, commonly called the great storm, set in at ten at night, on the 26th of November, 1703, and raged violently until seven the next morning. It extended its ravages to every part of the kingdom. In the capital, upwards of two thousand stacks of chimnies were blown down. The lead on the tops of several churches was rolled up like skins of parchment. Many houses were levelled with the ground, and by the fall of the ruins, 21 persons were killed, and more than 200 wounded. The ships in the Thames broke from their moorings: four hundred wherries were lost, and many barges sunk, with a great loss of lives. At sea the destruction was still greater: twelve ships of war, with upwards of eighteen hundred men on board, were totally lost, together with many merchantmen.

THE MONSOONS.

THE setting in of the Monsoon, or tropical sea wind, in the East Indies, is thus described by Forbes in his Oriental Memoirs. The scene was at Baroche, where the British army was encamped. "The shades of evening approached as we reached the ground, and just as the encampment was completed, the atmosphere grew suddenly dark, the heat became oppressive, and an unusual stillness presaged the immediate setting in of the monsoon. The whole appearance of nature resembled those solema preludes to earthquakes and hurricanes in the West Indies, from which the east in general is providentially free. We are allowed very

finite time for compensate; his a face authories the larger charles have given up.

" I had wither-not enventeen manipone to India, but this severaled them all in the award appreciance and droubful will a le. I am amound in a few minimum, on the horders of a lake formest to collect the aurocounting water, we found amendous in a few homes to a legand plate. The tentamore are my way, be a lorse soil, the tente fell down, and has the while army expected to the contrading elements. It requires a levely being ionium to courses the alteration of on hundred discussed begins because of every description, with more than two lundred thousand elephants, cantels, heres, and over, auditenly overwhelprid by this decadful gurms to a straige country, without any beautifully of high or has grounds the whale being envered by an hamonic lake, and consumeded by thick darborns, which presented our distinguishing a ungle edipted, earny ough as the vivid glare. of hightening allegibaried in horselfte foreign. His language came the eller the wronk of a large encougament than tomas minimumly destroyed, and covered with water a could the corne of old men and includes women, worlded by the similar christs of their expiring children, unable to affind though rulled. Distant this develop night, more than two tundeed persons and three thousand earle perished, and the marging days orbiblied a shorting speciale."

The southwest monorous governity was in very early to assembly present Irolin. "At Anjones," almorem the above public, "It commences with great revisity, and present on swild agreeted by the his bound weather continues, with more no loss abdonos, from May to Chicken i Sung that personal, the reorganismes in more valle from a black londerne, litterally of attechnics weather to evalue of decating amountains he extens under hours summits, until they appround the show, when their dispositions arrespositions there in oncommy surpressed took union the beach overs ofail was a & in artest to be convenilly more from order clien the lest, and threatens to averwhelm the settlement. It is min at there billiows enough that is the limited comme, and, with he thunder and belithing, so frequest in the rank sound. to truly awind. Thering the certical according to the Anjengo, I often samed upon oler for chiner, and hand So converged the enterest occurs, and water or claim to to 458

that sublime and omnipotent decree. 'Hitherto shalt thou come, but no further; and here shall thy proud waxes be stayed!'"

WHIRLWINDS AND WATERSPOUTS.

[See Plates, No. 49, 50, 51.]

Which shipmen do the hurricano call
Constring d in mass by the almighty sun.

SHAKSPEARE (Troilus and Cressula.)

In number 802 of the Monthly Magazine, Sir Richard Phillips, in describing a water-spout observed by him, points out the connexion between those phenomena, and offers a very philosophical explanation of the formation of

the latter.

"It happened to him," he observes," on the 27th of June, 1817, about seven in the evening, to witness the formation, operation, and extinction of what is called a water-spout; His attention was drawn to a sudden hurricane which nearly tore up the shrubs and vegetables in the western gardens, and filled the air with leaves and small collections of the recently-cut grass. Very dark clouds had collected over the adjacent country, and some stormy rain, accompanied by several strokes of lightning, followed this hurricane of wind. The violence lasted a few minutes, and the writer being drawn to an eastern balcony, it was evident that a whirlwind agitated a variety of substances which had been raised into the air. The storm proceeded from west to east, that is, from Hampstead over Kentish-Town towards Holloway. In about five minutes, in the direction of the latter place, a magnificent projection was visible from the clouds, like what is represented by Fig. 1 in the plate. It descended two-thirds of the distance from the clouds towards the earth, and evidently consisted of parts of clouds descending in a vertex, violently agitated like smoke from the chimney of a furnace recently supplied with fuel. It then shortened, and appeared to be drawn up towards the stratum of clouds, and presently it assumed the appearance represented by Fig. 2.

It finally drew itself into the cloud; but a small cone. or projecting thread, of varying size and length, continued for ten minutes. At the time, and for half an hopr after, a

and a second of each used southly falling from the rates of stands commetent with M. the eatent bone exactly desirand by the tree-dile of Hollowes, Distante, and Horrows .-Along two lance after, on within from Kongal Propo tomorely Holloway, a non-formal that of a of the by a next parcents of rain remarkaged by the inhabitogs but fullage arrange the time of the topper differ and some present beyone seen the projecting aloud, on absolute below excued that a contract against the form of the property of the men and old south. On president the grift Landon, various accessing is equiting with the argumention of pre-carrocived antions of the by-standars, was power; but, in the farm-yard at the three note atome, it appropried that some lary-makers nervand ston the come which sind which passed over Resault-Town, had primed over the loaded ninegon with an frameric and clear to oners it alrive twenty parch from its quition, and to put the men upon it, and on the rick, in her of their lives. Bostor the coul, it carried with it a susam of hav, and, warly uncoming a their on the other strip, filled the die to a great boucht with frogments of lar, leaves. and trouble of troop, who is remarkful a said flight of birds. On landly of the wetter to look the attendantly the of at of itemporist, property and they quit to tenter which, it sho they they truly in land of light of bleds Tray of marchine in id they decombine about dyna most ingonial and there, and other minerary direction it as a wast made of smake and the every stand of a printing and them it was a surfy with at in a parthern direction; and to possent a quarter of a mile worth, if was march version in a smallern direction, and all agree that it dress boottops withour rate, and was redouof more the roath by the tenne of he fit beaters. It assessed to where, and a replace fronting many, to let the little groups for a control and he of stong manners, he simmer going a sout of the obtainthen almost applithen of a remitting looks, next on the soul ever they alway till it startaned, and arodu ills arew too a conthey remed "

The interessive which the fifth incidence from what he examind heart, are as follows to True the planting manufactor of a major equal to a more collection of a builty of the example of t

vacuum, or high degree of rarefaction, extending between the clouds and the earth, the clouds descended in it by their gravity, or by the pressure of the surrounding clouds or air. That the convolutions of the descending mass, and the sensible whirlwind felt at the earth, as well as the appearance of the commencement, increase, and decrease, of the mass, all demonstrate the whirl of the air to be the mechanical cause.—That the same vortex, whirl, or eddy, of the air, which occasions the clouds to descend, occasions the loose bodies on the earth to ascend.—That, if in this case the lower surface had been water, the same mechanical power would have raised a body of foam, vapour, and water, towards the clouds.-That, as soon as the vortex or whirl exhausts or dissipates itself, the phenomena terminate by the fall to the lower surface of the light bodies or water, and by the ascent of the cloud.—That when water constitutes the light body of the lower surface, it is probable that the aqueous vapour of the cloud, by coalescing with it, may occasion the clouds to condense, and fall at that point, as through a syphon.—That if the descending cloud be highly electrified, and the vortex pass over a conducting body, as a church steeple, it is probable it may be condensed by an electrical concussion, and fall at that spot-discharging whatever has been taken up from the lower surface, and producing the strange phenomena of showers of frogs, fish, &c. -And, lastly, it appears certain, that the action of the air on the mass of clouds, pressing towards the mouth of the vortex as to a funnel (which, in this case, it exactly represented,) occasioned such a condensation as to anement the simultaneous fall of rain to a prodigy."

In the month of July, 1800, a water-spout was seen rapidly to approach a ship navigating between the Lipari Islands. It had the appearance of a viscid fluid, tapering in its descent, and proceeding from the cloud to join the sea. It moved at the rate of about two miles an hour, with a loud sound of rain, passing the stern of the ship, and wetting the after part of the mainsail. It was thence concluded that water-spouts are not continuous columns of water, as has been confirmed by subsequent observations.

In November, 1801, about twenty miles from Trieste, in the Adriatic sea, a water-spout was seen eight miles to the southward: round its lower extremity was a mist, twelve

tree high, nearly of the form of an Longin could, with copy large violates, the open resting difficulty in its cross of some chains from their quest, the contingent in the costs of some chains that a near man to the langle in short from the costs of projection that discential from the black choice which is a imperating, and next the anatomy may almost denote house for almost the case, the last ten yands of the discusse house properties with property appeared to be continued to allow appeared to insert it also cloud the quickether is a place only. The first open their complete gradually, and the assessment in the continue gradually, and the assessment in the continue there is a larger that the intention prescribed and according to the intention prescribed and the continue that in prescribed and the continue that is not the continue that is not the continue that the continue that is not the continue that the continue t

inverted other proportions from the cloud, appeared with an impounding spinations of the water below, but not attent on appears varieties under them; sweet, spinis in all were corned; and two mines projections to absurd. Some of the appears were not only ablique, but carved, the accurate chard moving most impirity in these which were very country. They have I man from their nines mounts, and their disappation was our anomalous with any fall of rain. For some days because the wonders had been very raine, with a S. E. wind; tout and any rain had falled up the day of observation.

The energy martine phonounced of which has been been occusionally involutive of much mischoof, or the laborance most connective will alread On the 20th of October, 1865. about ob in the executor, the west being then we decoully, a temperation which bid, manyly or the breath of they words, and which spent their brokens, seven minutes, using at Ashly, in North approaching. Its first general account call's maily, whose paid and hat were taken from all has bend, and the transcended many scores of purply from her, where I lay updiscovered his some days. If more queened a farmer and, where a laten is wrenging leady at the inteturns, breaking to prives the latter, and the wheels, there. of which, thus chattered, were blown mer to wall. Amother orasgon, which did not like the become, in orthon the years, in of this wind, was driven with great of the wrotant there also not the form between A beautiful die anti-true, and

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large that two stout men could scarcely lift it, was blown over a house without damaging it, although torn from a tree 100 yards distant. A slate was carried nearly 200 yards, and forced against a window, the iron bar of which it best. Several houses were stripped; and in one instance, this powerful gust, or stream of air, forced open a door, breaking the latch; whence it passed through the entry, and, forcing open the dairy door, overturned the milk-pans, and blew out three panes of glass. It next ascended to the chambers, and blew out nine other panes. Lastly, it blew a gate-post, fixed two feet and a half in the ground, out of the earth, and carried it many yards into the fields,

On the 30th of October, 1731, at one in the morning, a very sudden and terrific whirlwind, having a breadth of two hundred yards, was experienced at Cerne-Abbas, in Dorsetshire. From the south-west side of the town, it passed to the north-east, crossing the centre, and unroofing the houses in its progress. It rooted up trees, broke others in the middle, of at least a foot square, and carried the tops a considerable distance. A sign-post, five feet by four, was broken off six feet in the pole, and carried across a etreet forty feet in breadth, over a house opposite. The pinnacles and battlements of one side of the church-tower thrown down, and the leads and timber of the north aisle broken in by their fall. A short time before, the air was remarkably calm. It was estimated that this sudden and terrible gust did not last more than two minutes.

About the middle of August, 1741, at ten in the morning, several peasants being on a heath near Holkham in Norfolk, perceived, about a quarter of a mile from them, a wind like a whirlwind approach them gradually, in a strait line from east to west. It passed through the field where they were ploughing, and tore up the stubble and grass in the ploughed ground, for two miles in length, to the breadth of thirty yards. In reaching an enclosure at the top of a rising ground, it appeared like a great flash or ball of fire, emitting smoke, and accompanied by a noise similar to that of carts passing over a stony ground. Both before and after the wind passed, there was a strong smell of sutpliur; and the noise was heard long after the smoke had been perceived. This fiery whirlwind moved so slowly forward, that it was nearly ten minutes in proceeding from

the enclosure to a farm-house in the vicinity, where it didmuch mischief.

SOUNDS AND ECHOES.

Sound is propagated successively from the sounding: body to the places which are pearest to it, then to those more distant, &c. Every observer knows that when a gun is fired at a considerable distance from him, he perceives the flash a certain time before he hears the report : and the same thing is true with respect to the stroke of a hammer, or of a hatchet, the fall of a stone, or, in short, any visible action which produces a sound or sounds. general, sound travels through the air at the rate of 1142 teet in a second, or about thirteen miles in a minute. This is the case with all kinds of sounds, the softest whisper flying as fast as the loudest thunder. Sound, like light, after it has been reflected from several places, may be collected into one point as a focus, where it will be more audible than in any other part; and on this principle watspen-ING GALLERIES are constructed.

The particulars relative to the celebrated whispering gallery in the Dome of St. Paul's Church, London, will be comprehended in the description of that noble edifice.

An echo is the reflection of sound striking against a surface adapted to the purpose, as the side of a house, a brick wall, hill, &c. and returning back again to the ear, at distinct intervals of time. If a person stand about sixty-five or seventy feet from such a surface, and perpendicular to it, and speak, the sound will strike against the wall, and be reflected back, so that, he will hear it as it goes to the wall, and again on its return. If a bell situated in the same way be struck, and an observer stand between the bell and the reflecting surface, he will hear the sound going to the wall, and also on its return. Lastly, if the sound strike the wall obliquely, it will go off obliquely, so that a person who stands in a direct line between the bell and the wall will not hear the echo.

According to the greater or less distance from the speaker, a reflecting object will return the echo of several, or of fewer syllables; for all the syllables must be uttered before the echo of the first syllable reaches the ear, to prevent the confusion which would otherwise ensue. In a moderate

way of speaking, about three and a half syllables are pronounced in one second, or seven syllables in two seconds: therefore, when an echo repeats seven syllables, the reflecting object is 1142 feet distant; for sound travels at the rate of 1142 feet per second, and the distance from the speaker to the reflecting object, and again from the latter to the former, is twice 1142 feet. When the echo returns fourteen syllables, the reflecting object must be 2284 feet distant, and so on.

The most remarkable echo recorded, is at the palace of a nobleman, within two miles of Milan, in Italy. The building is of some length in front, and has two wings jutting forward; so that it wants only one side of an oblong figure. About one hundred paces before the mansion, a small brook glides gently; and over this brook is a bridge forming a communication between the mansion and the garden. A pistol having been fired at this spot, fifty-six reiterations of the report were heard. The first twenty were distinct; but in proportion as the sound died away, and was answered at a greater distance, the repetitions were so doubled that they could scarcely be counted, the principal sound appearing to be saluted in its passage by reports on either side at the same time. A pistol of a larger calibre having been afterwards discharged, and consequently with a louder report, sixty distinct reiterations were counted.

From this example it follows, that the farther the reflecting surface is, the greater number of syllables the echo will repeat; but that the sound will be enfeebled nearly in the same proportion, until at length the syllables cannot be distinctly heard. On the other hand, when the reflecting object is too near, the repetition of the sound reaches the ear, whilst the perception of the original sound still continues, in which case an indistinct resounding is heard, as may be observed in empty rooms, passages, &c. In such places, several reflections from the walls to the hearer, as also from one wall to the other, and then to the hearer, clash with each other, and increase the indistinction.

MISCELLANEOUS WONDERS OF NATURE.

THE GREAT SERPENT, CALLED THE BOA CONSTRICTOR.

Ye too, in other climes who harmless rove In gilded scales, the guardians of the grove, In horrid Afric's pestilential air Acquire new natures from the burning glare; Ride through the blaze of noon on sable wing, Quick on th' affrighted herds with fury spring, And gathering all your folds in wreathings dire, Bid the huge ox beneath your crush expire: 'Th' enormous elephant by force can slay, And need no poison to secure your prey.

Among serpents, the genus Boa is distinguished by its vast, and, indeed, almost unlimited size, as well as by its prodigious strength, which enables it to destroy cattle, deer, &c. by twisting around them in such a manner as to crush them to death by continual pressure. It also claims a superiority over other serpents by the beauty of its colours, and the peculiar disposition of its variegations. The entire ground colour of this animal, in the younger specimens, is a yellowish grey, and sometimes a bright yellow, on which is disposed, along the whole length of the back, a series of large, chain-like, reddish brown, and sometimes perfectly red variegations, leaving large open spaces of the ground colour at regular intervals. The largest, or prinripal marks, composing the above chain-like pattern, are of a squarish form, accompanied on their exterior sides by large triangular spots, with their points directed downward. Between these larger marks are disposed many smaller ones of uncertain forms, and more or less numerous in different parts. The ground colour itself is also scattered over by many small specks of the same colour with the variegations. The exterior edges of all the larger spots and markings are commonly blackish, or of a much deeper cast than the middle part, and the ground colour immediately accompanying the outward edges of the spots is, on the contrary, lighter than on the other parts, or even whitish, thus constituting a general richness of pattern, of which nothing but an actual view of a highly-coloured specimen

of the animal itself can convey a complete idea. In larger specimens, the yellow tinge is often lost in an uniform grey cast, and the red tinge of the variegations sinks into a deep chesnut: in some instances the general regularity of the pattern, as above described, is disturbed by a kind of confluent appearance. The head is invariably marked above by a large longitudinal dark band, and by a narrower lateral band passing across the eyes towards the neck.

It was, in all probability, an enormous specimen of this very serpent which once threw a whole Roman army into dismay. The fact is recorded by Valerius Maximus, who quotes it from one of the lost books of Livy, where it was detailed at a greater length. He relates that near the river Bagrada, in Africa, a snake was seen of so enormous a magnitude as to prevent the army of Atilius Regulus from the use of the river; and which, after having snatched up several soldiers with its enormous mouth, and killed several others by striking and squeezing them with the spires of its tail, was at length destroyed by assailing it with all the force of military engines and showers of stones, after it had withstood the attack of their spears and darts. It was regarded by the whole army as a more formidable enemy than even Carthage itself. The whole adjacent region was tainted with the pestilential effluvia proceeding from its remains, as were the waters with its blood, so as to oblige the Roman army to shift its station. The skin of this monster, measuring in length one hundred and twenty feet, was sent to Rome as a trophy, and was there suspended in a temple, where it remained till the time of the Numidian war.

In the narrative of Mr. McLeod, surgeon of the Alceste frigate, which conveyed the late embassy to China, and was wrecked in the Straits of Gaspar, is an account of a BOA CONSTRUCTOR having been embarked on board the Cæsar, the vessel which brought home the officers and crew of the shipwrecked frigate. The details are of great interest; but the mode in which this prodigy of nature was, during the passage, supplied with its food, causes humanity to shudder. Well may Sir Richard Phillips have remarked, in the supplementary number of the Monthly Magazine, [No. 307. p. 646.] that the parties guilty of the atrocious

act about to be described, ought themselves to have been

made to exchange places with the helpless goat !

The BOA CONSTRICTOR was a native of Borneo, and had been sent to Batavia, where he was embarked. was brought on board shut up in a wooden crib or cage, the bars of which were sufficiently close to prevent his escape; and it had a sliding door, for the purpose of admitting the articles on which he was to subsist; the dimensions of the crib were about four feet high, and about five feet square, a space sufficiently large to allow him to coil himself round with ease. The live stock for his use during the passage, consisting of six goats of the ordinary size, we're sent with him on board, five being considered as a fair allowance for as many months. At an early period of the voyage we had an exhibition of his talent in the way of eating, which was publicly performed on the quarterdeck, upon which he was brought. The sliding-door being opened, one of the goats was thrust in, and the door of the cage shut. The poor goat, as if instantly aware of all the horrors of its perilous situation, immediately began to utter the most piercing and distressing cries, butting instinctively, at the same time, with its head towards the serpent, in self-defence.

"The snake, which at first appeared scarcely to notice the poor animal, soon began to stir a little, and, turning his head in the direction of the goat, it at length fixed a deadly and malignant eye on the trembling victim, whose agony and terror seemed to increase; for previous to the snake seizing its prey, it shook in every limb, but still continuing its unavailing show of attack, by butting at the serpent, who now became sufficiently animated to prepare The first operation was that of darting for the banquet. out his forked tongue, and at the same time rearing a little his head; then suddenly seizing the goat by the fore-leg with his mouth, and throwing him down, he was encircled in an instant in its horrid folds. So quick, indeed, and so instantaneous was the act, that it was impossible for the eye to follow the rapid convolution of his elongated body. It was not a regular screw-like turn that was formed, but resembling rather a knot, one part of the body overlaying the other, as if to add weight to the muscular pressure, the snore effectually to crush his object. During this time he

468 continued to grasp with his mouth, though it appeared an unnecessary precaution, that part of the animal which he had first seized. The poor goat, in the meantime, continued its feeble and half-stifled cries for some minutes, but they soon became more and more faint, and at last it expired. The snake, however, retained it for a considerable time in its grasp after it was apparently motionless. began slowly and cautiously to unfold himself till the goat fell dead from his monstrous embrace, when he began to prepare himself for the feast. Placing his mouth in front of the head of the dead animal, he commenced by lubricating with his saliva that part of the goat; and then taking its muzzle into his mouth, which had, and indeed always has, the appearance of a raw lacerated wound, he sucked it in, as far as the horns would allow. protuberances opposed some little difficulty, not so much from their extent as from their points; however, they also, in a very short time, disappeared; that is to say externally; but their progress was still to be traced very distinctly on the outside, threatening every moment to protrude through The victim had now descended as far as the shoulders; and it was an astonishing sight to observe the extraordinary action of the spake's muscles when stretched to such an unnatural extent-an extent which must have utterly destroyed all muscular power in any animal that was not, like itself, endowed with very peculiar faculties of expansion and action at the same time. When his head and neck had no other appearance than that of a serpent's skin, stuffed almost to bursting, still the workings of the muscles were evident; and his power of suction, as it is erroneously called, unabated; it was, in fact, the effect of a contractile muscular power, assisted by two rows of strong hooked With all this he must be so formed as to be able to suspend, for a time, his respiration, for it is impossible to conceive that the process of breathing could be carried on while the mouth and throat were so completely stuffed and expanded by the body of the goat, and the lungs themselves (admitting the trachea to be ever so hard) compressed, as they must have been, by its passage downwards.

"The whole operation of completely gorging the goat, occupied about two hours and twenty minutes: at the end of which time the tumefaction was confined to the middle part of the body, or stomach, the superior parts, which had been so much distended, having resumed their natural dimensions. He now coiled himself up again, and laid quietly in his usual torpid state for about three weeks or a month, when his last meal appearing to be completely digested and dissolved, he was presented with another goat, which he devoured with equal facility. It would appear that almost all he swallows is converted into nutrition, for a small quantity of calcareous matter (and that, perhaps, not a tenth part of the bones of the animal) with occasionally some of the hairs, seemed to compose his general fæces;—and this may account for these animals being able to remain so long without a supply of food. He had more difficulty in killing a fowl than a larger animal, the former being too small for his grasp.

"As we approached the Cape of Good Hope, this animal began to droop, as was then supposed, from the increasing coldness of the weather, (which may probably have had its influence,) and he refused to kill some fowls which were offered to him. Between the Cape and St. Helena he was found dead in his cage; and, on dissection, the coats of his stomach were discovered to be excoriated and perforated by worms. Nothing remained of the goat except one

of the horns, every other part being dissolved."

THE SEA SERPENT.

The existence of this Marine prodigy on the coast of North America, has been placed beyond a doubt by the multiplied evidences procured by the Linnæan Society of New England established at Boston. The enquiries were founded on the rumours currently spread, on various authorities, that in the month of August, 1817, an animal of very singular appearance had been repeatedly seen in the harbour of Gloucester, Cape Ann, about thirty miles from Boston. It was said to resemble a serpent in its general form and motions, to be of immense size, and to move with wonderful rapidity; to appear on the surface of the water in calm and bright weather only; and to seem jointed, or like a number of buoys or casks following each other in a line. The following is a brief abstract of the evidences taken on oath in support of these rumours. The depositions were made before Lonson Nash, Esq. a magistrate of Gloucester, by whose

own account of the animal, of which he had a distinct view. it may not be improper to preface the various evidences

adduced.

Mr. Nash saw the serpent at the distance of about two hundred and fifty yards. It was so long, that the two extremes were not visible at one view, with a telescope.-He therefore judged it to be seventy, or, perhaps, a hundred feet in length. He perceived eight distinct portions. er bunches, apparently caused by the vertical motion of the animal, which he conjectures to be straight. In this vertical motion all the testimonies agree, as well as in the apparent bunches. The track made in the water was visible for half a mile, and the progress of the animal, when on its surface, a mile in four minutes : but when immersed, by the metion of the water, which could be often traced, he appeared to move a mile in two minutes, or in three minutes at the most. His body was of the size of a half-barrel, apparently rough, and of a very dark colour, in which latter particular all the accounts coincide.

A ship-master, and two of his men, being in a boat, approached this monstrous animal to within the short distance of thirty feet. They describe it as being of the serpent form, its head resembling that of a land snake, and very large, of the size of a ten gallon keg. It darted out its tongue, the extremity of which resembled a fisherman's harpoon, to the extent of two feet, raising it perpendicularly and again letting it fall. Over each of the eyes, which were very bright, was a bunch. Its body was apparently about two feet and a half in circumference. Its motion was at the rate of twelve or fourteen miles in an hour, much swifter than that of a whale, or any other fish, and vertical. but steady.

Another ship-master attests that he saw the serpent three times, twenty or thirty persons being present, at the distance of about 150 yards. Its apparent length was 80 or 90 feet, and its size that of a half-barrel. It had joints, or bunches, from head to tail; its head, which was raised two feet above the water, resembling that of a rattlesnake, and of the size of a horse's head. Its mouth was open about ten inches. Its body was of a dark chocolate colour, and rough and scaly. In turning short and quick, the first part of the curve it made resembled the link of a chain; but when the

head came parallel with the tail, they appeared near together; when on the surface of the water, its motion was slow, the animal at times playing about in circles, and at others moving nearly straight forward. In disappearing, it appa-

rently sunk directly down.

The other depositions were seven in number, three by merchants, one by a ship-master, one by a ship-carpenter, and two by mariners. One of them describes the tongue of the animal as resembling a prong, or spear, elevated about twelve inches, six inches in circumference, and terminating in a small point. The body appeared to be jointed, round. and about the size of that of a man. The other accounts agree in the foregoing particulars, all testifying the enormous length of the animal, which in some instances they estimate at 70 feet; and the extreme rapidity of its motion through the water. This motion was vertical, like that of the caterpillar. The ship carpenter, Matthew Gaffney, being in a boat on the 14th of August, and within thirty feet of the animal, discharged his piece, carrying a large ball, at its head, which be thought he struck. The creature turned immediately towards the boat, as if to approach it; but sunk down, and went directly under it, again making its appearance at about one hundred yards distance. not turn down like a fish, but appeared to settle directly down like a rock.

The society having been informed that an animal resembling the above had been seen at Plymouth, a sea-port belonging to the United States, two or three years before, procured the following testimony on oath from a ship-mas-.

ter residing there.

On the 20th of June, 1815, this deponent, Elkanah Finney, was suddenly called to witness a strange appearance in the cove next his house. By the aid of his glass, he was satisfied in a moment that it was some aquatic animal, with the form, motion, and appearance of which he had been hitherto unacquainted. It moved, at the distance of a quarter of a mile from the shore, with great rapidity towards the north, being then apparently about thirty feet in length; but in again making towards the cove, it displayed a much greater length, not less in the deponent's opinion, than a hundred feet. It approached him in a southerly direction, very rapidly, until it came in a line with him, when it

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stopped, and lay entirely still on the surface of the water. "I had then," observes the deponent, "a good view of the animal through my glass, at the distance of a quarter of a mile. His appearance in this situation was like a string of buoys. I saw perhaps thirty or forty of these protuberances or bunches, which were about the size of a barrel. The head which tapered off to the size of a horse's head, appeared to be about six or eight feet long, and where it was connected with the body was a little larger than the latter. I could not discern any mouth; but what I supposed to be his under jaw had a white stripe extending the whole length of the head just above the water. While he lay in this sit--uation, he appeared to be about a hundred or a hundred and twenty feet long. The body appeared to be of an uniform size. I saw no part of the animal which I supposed to be a tail, and thought therefore that he did not discover to me his whole length. His colour was a deep brown or black. I could not discover any eyes, mane, gills, or breathing holes. I did not see any fins or legs. mal did not utter any sound, and did not appear to notice any thing, but remained still and motionless for five minutes or more. The wind was light, with a clear sky, and the water quite smooth. He then moved to the southward, but not with as rapid a motion as before. The next morning at eight o'clock, it being quite calm, I again saw the animal about a mile to the northward of my house, down the beach: he did not display so great a length as the night before, perhaps not more than twenty or thirty feet. He often disappeared, and was gone five or ten minutes under water. I thought he was diving or fishing for his food.-He remained nearly in the same situation, and thus employed, for nearly two hours. I then saw him moving off, in a northern direction, towards the light-house. I could not determine whether his motion was up and down, or to the right and left; but his quickest motion was very rapid; I should suppose at the rate of fifteen or twenty miles an hour. Mackarel, herrings, and other bait fish, abound in the cove where the animal was seen."

This deposition is considered as impartial and unbiassed, it agreeing uniformly with the deponent's first declarations in 1815. When made, he had not perused the testimouials procured at Cape Ann; and having been engaged from his

youth in foreign voyages, and frequently seen whales, and almost every species of fish, his testimony must be allowed to have great weight.

In corroboration of the existence of the Sea Serpent on the coast of North America, the testimony of the Rev. Mr. Cummings, a clergyman employed in the Missions of the district of Maine, is adduced by the Society. His relation, made in the month of June, 1809, was taken down in writing by a friend. It states that in Penobscot bay, a Sea Serpent, supposed to be about sixty feet in length, and of the size of a sloop's mast, had been occasionally seen within the last thirty years. Mr. Cummings being with a party, in a boat twenty-three feet in length, the animal approached to within fifteen rods, and was judged to be about three times that length. He held his head, which resembled that of a common snake, flattened, and about the size of a pail, five feet out of the water. About the head and peck the colour was a bluish green; but the tint of the body could not be determined, on account of the rippling of the water. The British, Mr. Cummings observed, saw him in their expedition to Bagaduse, and estimated his length at 300 feet, which he thought an exaggeration. He added that this animal had been frequently seen by the inhabitants of Fox and Long Islands, Mount Desert, &c.

In the communication to the Society from which the above extract is made, there are two other testimonies, that of a Captain Lillis, who observed that he had seen off the coast, in 1809, a very singular fish, about forty feet long, which appeared more like an ordinary serpent than a fish, holding his head erect, without a mane;—and that of a resident of one of the islands in the Bay of Penebscot, who declared that he had often seen a marise monster of this description, which was as large as a sloop's boom, and about sixty or seventy feet long. He asserted that about the year 1780, as a schooner was lying at the mouth of the river, or in the bay, one of these enormous creatures leaped over it between the masts: the men ran into the hold for fright, and the weight of the serpent sunk the vessel, which was of eighteen tons burthen, 'one strenk,' or plank.

Extracts are given by the Society from the Natural History of Norway, by Pontoppidan, Bishop of Bergen, to show how much his account of the Sea Serpent on the Norwegian coast agrees with the above depositions and The following passage will suffice to evince statements. this, with the difference, however, that the Norwegian Serpent is represented as much longer, and of a proportionate bulk. "Though one cannot," says the Bishop, "have an opportunity of taking the exact dimensions of this creature, yet all who have seen it are unanimous in affirming, as far as they can judge at a distance, that it appears to be the length of a cable, i. e. one hundred fathoms, or six hundred English feet; that it lies on the surface of the water, when it is very calm, in many folds; and that there are, in a line with the head, some small parts of the back to be seen above the surface of the water, when it moves or bends. These at a distance appear like so many casks or hogsheads floating in a line, with a considerable distance between them. Mr. Tuchsen, of Heroe, is the only one of the many correspondents I have, who informs me that he has observed the difference between the body and the tail of this creature, as to thickness. that it does not, like the eel or land snake, taper gradually to a point, but that the body, which looks to be as big as two hogsheads, grows remarkably small at once where the tail begins. The head in all the kinds has a high and broad forehead, but in some a pointed snout, though in others that is flat, like that of a cow or horse, with large nostrils, and several stiff hairs standing out on each side, like whiskers. The accounts add, that the eyes of this creature are very large, of a blue colour, and looked like a couple of bright pewter plates. The whole animal is of a dark brown colour, but speckled and variegated with light streaks or spots, which shine like tortoise shell. Some say it sheds its skin like the land snake. The wind is so destructive to this creature, that it is never seen on the surface of the water but in the greatest calm; and the least gust of wind drives it immediately to the bottom again. It shoots through the water like an arrow from the bow. seeking constantly the coldest places. I have been informed by some of our seafaring men that a cable would not be long enough to measure the length of some of them. when they are observed on the surface of the water in an even line. They say those round lumps or folds sometimes lie one after another as far as a man can see."

The report of the Committee of the Linnæan Society adds: "We have seen and heard sundry other statements, of various authority, relating to similar animals, said to have been seen at sea by different persons; but do not insert them in our report, because we consider the foregoing testimony sufficient to place the existence of the animal beyond a doubt; and because they do not appear so minute and so well authenticated as the preceding documents."

About four weeks after the depositions, the substance of which has been given above, had been received, a young serpent of a remarkable appearance was brought from Gloucester to Boston, and exhibited as the progeny of the Great Sea Serpent. It had been killed in a meadow situated on the eastern shore of Cape Ann, within 150 paces of high water mark, by a planter, who, with a pitchfork, confined the animal against some loose rocks. He exhibited the most violent rage, biting himself twice, holding on, and shaking (to use the planter's expression) as one dog shakes another in fighting. His tail seemed likewise a weapon of defence; for he struck the end of it against the handle of the fork several times. His progressive movement was vertical, but slow, and was produced, first by contracting, and then by extending the body. When contracted, the animal was not more than a foot and a half in length; and the protuberances on his back were then at least three times as large as when he was extended.

The Committee of the Linuxean Society having inspected both the external and internal structure of this animal, which they name the Scoliophis Atlanticus, or flexuous serpent of the Atlantic, proceed to remark that it has the general form and external characters of a serpent, but is remarkably distinguished from all others of that class by a row of protuberances along the back, apparently formed by undulations of the spine. These protuberances are forty in number, and their size is proportioned to that of the body, at the places where they are respectively situated. Thus the body can be bent with facility upward and downward, a circumstance not common to other serpents. The whole length of the animal is 2 feet 11 2 inches.

After a minute anatomical description of the Scoliophis Atlanticus (the young serpent) the Committee discuss the question whether it is to be so identified with the Great

Sea Serpent, as to be considered of the same species. The appearance, they remark, at nearly the same time and place. of two creatures agreeing with each other in certain important and conspicuous particulars, disagreeing in the most remarkable of these particulars with other animals of their class, and between whom no difference, but that of size, has been discovered, must naturally lead to a conjecture that they are of the same species. The appearances noticed in the depositions, relative to the great serpent, bating a few exceptions, agree with, and are accounted for, by a structure like that of the Scoliophis. The protuberances seen above the water might have been produced in two ways: by bunches on the back projecting out of the water; or by vertical undulations of the body when in mo-The supposition that both these appearances have been presented at different times, is the most satisfactory mode of accounting for the variety of testimony with regard to the number, size, and distance of these protuberances. The other facts stated in relation to the form and general arrangement of colours in the large serpent, apply sufficiently well to the Scoliophis. The shape of the head and proportion of the eye-the protuberance on the side of the head, just above the eye-the form of the mouththe distance from the head to the commencement of the protuberances—the brown colour of the body, and the whitish colour of the under part of the head and neck-the disappearance of bunches from what was supposed to be the navel toward the tail-the tapering of the body toward the tail-its roundness, and great flexibility, are all points of the closest resemblance. These coincidences cannot be the effect of design, since all the depositions from Gloucester, relative to the Great Serpent, were in the hands of the Committee before the Scoliophis was discovered.

The prong or spear seen near the head of the former, when in motion, was probably the tongue. The shape of a harpoon, ascribed to that organ, was doubtless an optical illusion, occasioned by its rapid vibration; and this, it is well known, is not the first instance of such a deception. The structure of the Scoliophis is besides well suited to a residence in the water, being capable of various and complicated motions. It bends horizontally, as did the Great Serpent, in the act of turning; it bends vertically, as

that animal is supposed to do in the act of swimming; and it might assume any compound and intermediate motion, that would be most effectual in propelling it through the water.

Supposing, therefore, the species of the two serpents to be the same, it is not improbable that the one is the progeny of the other. The Colubri without fangs, the tribe most nearly resembling the Scoliophis, are said by naturalists to be generally, if not always, oviparous; to deposit their eggs in the sand in the spring, or in the end of summer; and to abandon them. These eggs are hatched by the heat of the sun often in less than a month. It should be remarked that the large serpents described in the accounts and depositions, were seen near the shore, and, with one exception, in the

month of August only.

In reply to the three principal objections which may be made against the specific identity of the two animals; and, first, their disproportionate size. This is not apparently greater than is found between the young and full grown individuals of some other animals, among which may be cited the BOA CONSTRICTOR. Secondly, that the one was seen only in the water, and the other on land. This objection is lessened when it is recollected that the eggs of amphibious animals are deposited on land. The large serpent may have visited the shore in the night, or at other That it was an amphibious animal, dependent on respiration, is rendered probable by its general structure, and by its frequenting the surface of the water, often with its head elevated above it. The small serpent was found near the salt water, in a place over which the sea breaks in stormy weather. Supposing it a young animal, it might have remained in the place where it was hatched, or it might have occasionally resorted to the shore from the water. It could not be expected to venture far from the shore, until its increased size should afford it some security from becoming a prey to larger animals of the ocean. Lastly, the circumstance that not any evidences of immaturity were observed in the Scoliophis might be considered as a source of a third objection, if it were not well known that, as serpents generally abandon their eggs, the young are perfect in all their parts, and capable of providing for their own subsistence, immediately on their being hatched.

On the whole, the Committee observe, as these two an-

imals agree in so many conspicuous, important, and peculiar characters, and as no material difference has been yet clearly pointed out, excepting that of size, the Society will probably feel justified in considering them individuals of the same species, and entitled to the same name, until a more close examination of the Great Serpent shall have disclosed some difference of structure, important enough to constitute a specific distinction.

A postscript centainsa communication from Long Island. stating that, on the 5th of October, 1817, the Sea Serpent had been seen in the sound. At the distance of half a mile from the shore, a long, rough, dark-looking body was observed, making a rapid progress towards New York. against a brisk breeze and a strong ebb tide. The observers were soon convinced that it was a living animal. His head did not as first appear more elevated above the water than the ridges or humps on his back; but when he was afterwards seen, nearly in the middle of the Sound, his body, owing to the increased velocity with which he moved, became more depressed, and his head greatly elevated. He was distinctly seen for about ten minutes, during which short space it was estimated that his progress was not less than six or seven miles. His back, 40 or 50 feet of which appeared above the surface of the water, was irregular, uneven, and deeply indented. The general description of the animal, in this statement, agrees with those already given; but it is said that the extreme rapidity with which he moved, created a swell not unlike that of a boat towed rapidly at the stern of a vessel.

THE RATTLESNAKE.

THE genus CROTALUS, OF RATTLESNAKE, affords the most signal examples of the powerfully destructive poison with which some of the serpent tribe are furnished; instances having frequently occurred in which the bite of these snakes has, in the space of a few minutes even, proved fatal to man.

It was not until the discovery of the western hemisphere, that naturalists beheld with amazement a reptile of the most fatal nature, furnished, agreeably to their conception, as if by a peculiar institution of Providence, with an instrument capable, in general, of warning mankind of their danger on

too near an approach. This is, however, treated by Dr. Mead as a vulgar error; and he very sensibly observes, that "all the parts of animals are made either for the preservation of the individual, or for the propagation of its species; this before us is for the service of the individuals. snake lives chiefly on squirrels and birds, which a reptile can never catch without the advantage of some management to bring them within his reach. The way is this. The snake creeps to the foot of a tree, and by shaking his rattle. awakens the little creatures which are lodged in it. are so frightened at the sight of their enemy, who fixes his lively piercing eyes upon one or other of them, that they have not the power to get away, but leap from bough to bough, till they are quite tired, and at last falling to the ground, are snapped into his mouth. This is, by the people of the country, called the charming of squirrels and This opinion of Dr. Mead is supported by Dr. Barton of Philadelphia, who, in a memoir on the supposed fascinating power of the rattlesnake, imagines the whole to be nothing more than the fluttering of old birds in defence of their young, and which are themselves occasionally caught by the rattlesnake, in consequence of too near an approach.

This species is in general from three to five feet in length; but one is described by Catesby as measuring eight feet. This traveller observes, that "it is the most inactive of all snakes, and has the slowest motion, never being the aggressor, except in what it preys upon; for unless it is disturbed. it will not bite." It is of a yellowish-brown colour, marked throughout its whole length with several transverse and somewhat irregular fasciæ of deep brown. From the head to some distance down the neck run two or three longitudinal stripes of the same colour. The head is large, flat, and covered with small scales; the rest of the upper parts with moderate large oval ones, all strongly furnished with a prominent line down the middle: the under parts are of a dingy yellowish-brown colour, marked with numerous dusky variegations and freckles. At the extremity of the tail is situated the rattle, consisting of several hard, dry, horny processes, which, on the least disturbance or irritation, is elevated and shaken in such a manner as to cause a

strong and brisk rattling sound.

The rattlesnake is a viviparous animal, and is said to practise the same extraordinary mode of preserving its young from danger as is ascribed to the viper in Europe, that is, by receiving them into its mouth and swallowing them. M. de Beauvois, in the relation of his travels, declares that he was himself an eye-witness of this process. Happening, in his walk, to disturb a large rattlesnake, the creature immediately coiled itself up, opened its jaws, and instantly five small ones, which were lying near it, rushed into its mouth. He retired, and watched the snake, and in a quarter of an hour saw her again discharge them. He then approached the second time, when the young retired into its mouth with greater celerity than before, and the snake immediately moved off among the grass, and escaped.

THE COBRA DE CAPELLO.

THE following interesting account of this very curious snake, a native of India, is extracted from Forbes' Oriental Memoirs, a work the merits of which cannot be sufficiently

praised.

"The Cobra de Capello, or hooded-snake (coluber naja), called by the Indians the man, or nagao, is a large and beautiful serpent; but one of the most venemous of all the coluber class; its bite generally proves mortal in less than an hour. It is called the hooded-snake, from having a curious hood near the head, which it contracts or enlarges at pleasure; the centre of this hood is marked in black and white like a pair of spectacles, whence it is also named the

spectacle snake.

"Of this genus are the dancing-snakes, which are carried in baskets throughout Hindostan, and procure a maintenance for a set of people, who play a few simple notes on the flute, with which the snakes seem much delighted, and keep time by a graceful motion of the head, erecting about half their length from the ground, and following the music with gentle curves, like the undulating lines of a swan's neck. It is a well attested fact, that when a house is infested with these snakes, and some other of the coluber genus, which destroy poultry and small domestic animals, as also by the larger serpents of the boa tribe, the musicians are sent for; who, by playing on a flagelet, find out their hiding-places, and charm them to destruction: for no sooner do the snakes

hear the music than they come softly from their retreat, and are easily taken. I imagine these musical snakes were known in Palestine, from the Psalmist comparing the ungodly to the deaf adder, which stoppeth her ears, and refuseth to hear the voice of the charmer, charm he never so wisely.

"When the music ceases the snakes appear motionless; but if not immediately covered up in the basket, the spectators are liable to fatal accidents. Among my drawings is that of a Cobra de Capello, which danced for an hour on the table while I painted it; during which I frequently handled it, to observe the beauty of the spots, and especially the spectacles on the hood, not doubting but that its venomous fangs had been previously extracted. But the next morning my upper servant, who was a zealous Mussulman, came to me in great haste, and desired I would instantly retire. and praise the Almighty for my good fortune; not understanding his meaning, I told him that I had already performed my devotions, and had not so many stated prayers. as the followers of his prophet. Mahomed then informed me, that while purchasing some fruit in the bazar, he. observed the man who had been with me the preceding evening, entertaining the country people with his dancing snakes; they, according to their usual custom, sat on the ground around him; when, either from the music stopping two suddenly, or from some other cause irritating the vicious reptile which I had so often handled, it darted at the throat of a young woman, and inflicted a wound of which she died in about half an hour. Mahomed once more repeated his advice for praise and thanksgiving to Alla, and recorded me in his calendar as a lucky man."

THE CERASTES, OR HORNED ENAKE.

This curious species is a native of many parts of Africa, and is also frequent in Egypt, Syria, and Arabia. It is about two feet in length, and is distinguished by a pair of horns, or curved processes, situated above the eyes, and pointing forwards: these horns have not any thing analogous in their structure to the horns of quadrupeds, and are by no means to be considered in the light of offensive or defensive weapons: they increase however the natural antipathy sogenerally felt against the serpent tribe, and give the animal a more than ordinary appearance of malignity. Its bite is

much to be dreaded, since, exclusive of the general danger of treading accidentally on this reptile, and thus irritating it unawares, it possesses a propensity to spring suddenly to a considerable distance, and assail without provocation those who happen to approach it. "When," Mr. Bruce observes, "he inclines to surprise any one, the Cerastes creeps with his side towards the person, and his head averted, till judging his distance, he turns round, springs upon him, and fastens on the part next to him."

On the subject of the incantation of serpents this celebrated traveller remarks as follows: "There is not any doubt of its reality: the scriptures are full of it; and those who have been in Egypt have seen as many different instances as they chose. Some have suspected that it was a trick, and that the animals so handled had been first trained, and then disarmed of the power of hurting; and, fond of the discovery, have rested themselves upon it, without experiment, in the face of all antiquity. But I will not hesitate to aver, that I have seen at Cairo (and this may be seen daily, without trouble or expense) a man who came from above the catacombs, where the pits of the mummy birds are kept, who has taken a Cerastes with his naked hand, from a number of others lying at the bottom of a tub, has put it upon his bare head, covered it with the common red cap he wears, then taken it out, put it on his breast, and tied it about his neck like a necklace; after which it has been applied to a hen, and bit it, which has died in a few minutes; and, to complete the experiment, the man has taken it by the neck, and, beginning at the tail, has eaten it, as one would do a carrot. or a stock of celery.

"However lively the snake may have been before, when he is seized by any of these barbarians, he seems as if taken with sickness and feebleness, frequently shuts his eyes, and never turns his mouth towards the arm of the person who holds him. On their being questioned how they are exempted from its attack, the gravest and most respectable among the Egyptians reply that they were born so; while the lower sort talk of enchantments by words and by writing. They all pretend to prepare any person by remedies, that is, by decoctions of herbs and roots. Be this as it may, the records of history attest, that where any country has been remarkably infested by serpents, there the people

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have been screened by a secret of some kind. Thus it was with the Psylli and Maronides of old."

"Tame at whose spell the charm'd Cerastes lay."

GREAT VIPER OF MARTINIQUE.

THIS formidable reptile is peculiar to the islands of Martinique, St. Lucie, and Beconia, and has never been traced to the American continent. On account of its triangular head, resembling that of a spear, it has been named by the French naturalist TRIGONOCEPHALUS: when full grown it is nearly eight feet in length, and its bite is highly dangerous. Its agility is, as well as its mode of darting, very remarkable > it rolls the body in four circles. one upon another, the circumvolutions of which incline all at once at the wilf of the animal, so as to throw the whole mass forward five or six feet. After the manner of the crested or hooded snake, it can raise itself upright on its tail, and thus attain the height of a man; at the same time that, by means of large scales, laid over each other, with which the belly is covered, this serpent, like the adder, can climb large trees, and creep among the branches, in order to reach the birds' nests, whose young he devours, and in which he has often been found coiled up.

FASCINATING POWER OF SNAKES.

A REMARKABLE instance of the fascinating power of snakes is given in Lichtenstein's travels in Southern Africa. In rambling in the fields near Cape Town, he saw, at the brink of a ditch, a large snake in pursuit of a field mouse. The poor animal was just at its hole, when it seemed in a moment to stop, as if unable to proceed, and without being touched by the snake, to be palsied with terror. The snake had raised its head over him, had opened its mouth, and seemed to fix its eyes stedfastly upon him. Both remained still awhile; but as soon as the mouse made a motion, as if to flee, the head of the snake instantly followed the movement, as if to stop his way. This sport lasted four or five minutes, till the author's approach put an end to it: the snake then snapped up his prey hastily, and glided away with it to a neighbouring bush. "As I had." he observes, "heard a great deal of this magic power in the snake over smaller animals, it was very interesting to me to see a spe-

I think it may be made a question, however. cimen of it. whether the poisonous breath of the reptile might not really have had the effect of paralysing the limbs of the mouse, rather than that its inability to move proceeded either from the fixed eye of the snake, or the apprehension of inevitable death. It is remarkable, and very certain, that serpents will sport with their prey, as cats do, before they kill it."

This author notices several peculiarities of the snakes of South Africa. A very rare description of serpent is there called the Spurring Snake. It is from three to four feet long, of a black colour, and has the singular property, as the colonists assert, that, when it is attacked, it spurts out its venom, and knows how to give it such a direction as to hit the eyes of the person making the attack. This is followed by violent pain, and by so great an inflammation, that it frequently occasions the entire loss of the sight.-The Por-Adden, one of the most poisonous species, is distinguishable by a disproportionate thickness, and by a body handsomely spotted with black and white spots on a brownish ground. It has this peculiarity, that, when it is enraged, it swells out its neck to a very great size. One which was caught, measured in length about an ell and a half, and was about six inches round in its greatest circumference.—One of the species, called the TREE SNAKE, was caught while in the act of climbing up the wall of a farmhouse, to take the swallows which had their nests under the roof. This snake is extremely adroit at climbing, and is, therefore a terrible enemy to small birds. Its bite is extremly venomous, and is considered as mortal. here noticed, measured six feet in length, with a black back, and grevish belly. In the belly were found six halfdigested young swallows .- The LEMON SNAKE measures about five feet in length, and has a skin of a fine lemoncolour, regularly spotted with black.

THE ELEPHANT.

How instinct varies in the grov'lling swine, Compar'd, half-reasoning elephant, with thine! 'Twixt that, and reason, what a nice barrier! For ever separate, yet for ever near!

THE largest elephants are from ten to eleven feet in height. some are said to exceed it; but the average is eight or nine

feet. They are fifty or sixty years before they arrive at their full growth; and their natural life is about one hundred and twenty years. Their price increases with their merit during a course of education. Some, for their extraordinary qualities, become in a manner invaluable; when these are purchased, no compensation induces a wealthy

owner to part with them.

The skin of the elephant is generally a dark grey, sometimes almost black; the face frequently painted with a variety of colours; and the abundance and splendour of his trappings add much to his consequence. In India the Mogul princes allow five men and a boy to take care of each elephant; the chief of them, called the mahawut rides upon his neck to guide him; another sits upon the rump, and assists in battle; the rest supply him with food and water, and perform the necessary services. Elephants bred to war, and well disciplined, will stand firm against a volley of musquetry, and never give way unless severely wounded. One of these animals has been seen with upwards of thirty bullets in the fleshy parts of his body, perfectly recovered from his wounds. All are not equally docile, and when an enraged elephant retreats from battle, nothing can withstand his fury: the driver having no longer a command, friends and foes are involved in undistinguished ruin.

The elephants in the army of Antiochus were provoked to fight by shewing them the blood of grapes and mulberries. The history of the Maccabees informs us, that "to every elephant they appointed a thousand men, armed with coats of mail, and five hundred horsemen of the best; these were ready at every occasion; wherever the beast was, and whithersoever he went, they went also; and upon the elephants were strong towers of wood, filled with armed men,

besides the Indian that ruled them."

Elephants in peace and war know their duty, and are more obedient to the word of command than many rational beings. It is said they can travel, on an emergency, two hundred miles in forty-eight hours; but will hold out for a month, at the rate of forty or fifty miles a day, with cheerfulness and alacrity. "I performed," observes Forbes in his Oriental Memoirs, "many long journeys upon an elephant: nothing could exceed the sagacity, docility, and affection of this noble quadruped. If I stopped to enjoy

a prospect, he remained immoveable until my sketch was finished; if I wished for ripe mangoes growing out of the common reach, he selected the most fruitful branch, and breaking it off with his trunk, offered it to the driver for the company in the houdah, accepting of any part given to himself with a respectful salem, by raising his trunk three times above his head, in the manner of the oriental obeisance, and as often did he express his thanks by a murmuring noise. When a bough obstructed the houdab. he twisted his trunk around it, and, though of considerable magnitude, broke it off with ease, and often gathered a leafy branch, either to keep off the flies, or as a fan to agitate the air around him, by waving it with his trunk; he generally paid a visit at the tent-door during breakfast, to procure sugar-candy or fruit, and be cheered by the encomiums and caresses he deservedly met with: no spaniel could be more innocently playful, nor fonder of those who noticed him, than this docile unimal, which on particular occasions appeared conscious of his exaltation above the brute creation."

However surprising may be the docility of this noble animal, when tamed, its sagacity, in a savage state even, is a subject of still greater wonder, as is evidenced by the following narrative extracted from Lichtenstein's travels in Two individuals, named Muller and Southern Africa. Prince, being engaged, in the Caffre territory, where these animals abound, in an elephant hunt, discovered the footsteps of a very large elephant, and soon espied the animal himself on the declivity of a naked and widely outstretched It is a rule, when an elephant is thus found, to endeavour to get above him on the hill, to the end that, in case of necessity, the hunter may flee to the summit, whither the animal, on account of the unwieldiness of its body, cannot This precaution was neglected by Prince, follow him fast. who shot too soon, while they were yet at too great a distance, and the elephant on higher ground than himself and his companion. The wounded animal rushed down towards them, while they endeavoured to push their horses on, and gain the brow of the hill. Being able, on favorable ground, to run as fast as a horse, he soon came up with them, and struck with his tusk at Muller's thigh, he being the nearest of the two fugitives. Muller now considered

his fate as inevitable, as he endeavoured in vain to set his almost exhausted horse into a gallop, and saw the animal, after giving a violent snort, raise his powerful trunk above his head. It was not, however, on himself, but on his companion, that the stroke fell; and in an instant he saw him snatched from his horse, and thrown up into the air. Scarcely in his senses, he continued his flight, and only in some degree recovered himself by finding Prince's horse running by his side without a rider: then looking back. he saw his unfortunate friend on the ground, and the elephant stamping upon him with the utmost fury. He was now convinced, not without the greatest astonishment, that the sagacious animal had distinguished which of the two it was who wounded him, and wreaked his whole vengeance upon him alone. Muller, on this, went in search of the rest of the party, that they might collect the mangled remains of their companion, and bury them; but they were soon put to flight by the elephant rushing again from a neighbouring thicket, to vent his wrath once more upon the corpse, already so dreadfully mangled. While he was busied in doing this, however, he was attacked by the dispersed hunters, and sacrificed to the manes of his unfortunate victim.

The contrivances for taking elephants are various; but the most curious are those employed by the natives of Ceylon, where the finest race of these animals is found, They sometimes surround the woods in bands, and drive with lighted torches, amid the clamour of trumpets, the discharge of fire-arms, and noises of every description, the elephants which inhabit them, till they are at length entrapped into a particular spot surrounded with palisades, so as to prevent all escape. At other times a kind of decov, or female elephant, is sent out in order to induce some of the males to pursue her, who are by that means secured. When a wild elephant is taken, it still remains to reduce it to a quiet state, and to tame it, in order to its being made useful: this is effected by throwing ropes round the legs and body, which are well secured; and two tame elephants, properly instructed, are placed on each side. The captive animal finds himself gradually so ratigued by his ineffectual struggles, and so much soothed by the caresses occasionally given by the trunks of the tame elephants, by the food from time to time presented to him, and the water with which he is refreshed by its being poured over him, that in the space of a few days, unless more than unusually untractable in his nature, he becomes completely tame, and is placed with the rest of the domesticated troop. Sometimes, in order more effectually to subdue them, the elephants are deprived of sleep for a considerable time.

The anecdotes recording the sagacity, and also the amiable qualities of the elephant, are numerous. Of these the following are selected as highly interesting. In Delhi, an elephant passing along the streets, put his trunk into a tailor's shop, where several persons were at work. One of them pricked the end of his trunk with his needle; the beast passed on; but at the next dirty puddle filled his trunk with water, returned to the shop, and spurting it. among those who had offended him, spoiled their work .-At Adsmeer, an elephant which often passed through the bazar, or market, as he went by a certain herb-woman, always received from her a mouthful of greens: at length he was seized with one of his periodical fits of rage, broke his fetters, and, running through the market, put the croud to flight, and, among others, this woman, who, in her haste, forgot a little child she had brought with her. animal recollecting the spot where his benefactress was wont to sit, took up the infant gently on his trunk, and placed it in safety on a stall before a neighbouring house.— At the same place, another elephant, in his madness, killed his cornac, or governor: the wife, witnessing the misfortune, took her two children, and flung them before the elephant, saying, "now you have destroyed their father, you may as well put an end to their lives and mine." It instantly stopped, relented, took the eldest of the boys, placed him on his neck, adopted him for his governor, and never afterwards would permit any other person to mount him.-A painter was desirous of drawing the elephant kept in the menagerie at Versailles, in an uncommon attitude, namely, that of holding his trunk raised up in the air, with his mouth open. The painter's boy, in order to keep the animal in this posture, threw fruit into his mouth; but as the lad frequently deceived him, and made an offer only of throwing the fruit, he grew angry; and, as if he had known that the painter's intention of drawing him was

the cause of the affront thus offered, instead of avenging himself on the lad, he turned his resentment on the master, and taking up a quantity of water in his trunk, threw it on the paper on which the painter was drawing, and spoiled it.

THE OBANG OUTANG.

Thus singular animal, likewise called the satyr, great ape, or man of the woods, which has, on account of its near approximation to the human species, so strongly excited the attention of naturalists, is a native of the warmer parts of Africa and India, where it resides principally in woods, on the fruits of which it feeds, like the other species of the simia race. Such of these animals as have been imported into Europe have rarely exceeded the height of two or three feet, and have therefore been supposed to be young; those full grown being said to be at least six feet in height. The general colour of the orang outang is a dusky brown: the face is bare; the ears, hands, and feet, nearly similar to the human; and the whole appearance such as to exhibit the most striking approach to the human figure. The likeness, however, is only a general one, and the structure of the hands and feet, when examined with an anatomical precision, seems to prove that the animal was principally designed by nature for the quadruped mode of walking, and not for an upright posture, which is only occasionally assumed, and which, in those exhibited to the public, is, perhaps, rather owing to instruction than truly natural. Buffon, indeed, makes it one of the distinctive characters of the real or proper apes, of which the orang outang is the chief, to walk erect on two legs only; and it must be granted that these animals support an upright posture much more easily and readily than most other quadrupeds, and may probably be often seen in this attitude even in a state of nature.

The manners of the orang outang, when in captivity, are gentle, and perfectly devoid of that disgusting ferocity so conspicuous in some of the larger baboons and monkies. It is mild and docile, and may be taught to perform, with dexterity, a variety of actions in domestic life. Thus it has been seen to sit at table, and, in its manner of feeding and general behaviour, to imitate the company in which it was

placed; to pour out tea, and drink it without awkwardness or restraint; to prepare its bed with exactness, and compose itself to sleep in a proper manner. Such are the actions recorded of one which was in London, in 1738.

The orang-outang described by Buffon was mild, affectionate, and good-natured. His air was melancholy. his gait grave, his movements measured, his disposition gentle. and very different from those of other apes. He had neither the impatience of the Barbary ape, the maliciousness of the baboon, nor the extravagance of the monkey tribe. It may be alledged, observes this writer, that he had had the benefit of instruction; but the other apes I shall compare with him were educated in the same manner. . words alone were sufficient to make our orang-outang act; but the baboon required a cudgel, and the other apes a whip; for none of them would obey without blows. I have seen this animal present his hand to conduct the persons who came to visit him, and walk as gravely along with them as if he had formed a part of the company. I have seen him sit down at table, unfold his napkin, wipe his lips, use a spoon or fork to carry the victuals to his mouth, pour his liquor into a glass, and make it touch that of a person who drank along with him. When invited to take tea, he brought a cup and a saucer, placed them on the table, put in sugar, poured out the tea, and allowed it to cool before he drank it. All these actions he performed without any other instigation than the signs or verbal orders of his master, and often of his own accord. Far from doing an injury to any one, he even approached company with circumspection, and presented himself as if he wished to be caressed.

Doctor Tyson, who, about the close of the seventeenth century, gave a very exact description of a young orangoutang, then exhibited in the metropolis, observes that, in many of its actions, it seemed to display a very high degree of sagacity, and was the most gentle and affectionate creature imaginable. Those whom it had known on shipboard it embraced with the greatest tenderness, opening their bosoms, and clapping its hands around them; and although several monkies had been embarked, still it was observed that, during the passage to England, it would never associate with them, and, as if nothing akin to them, would

carefully avoid their company.

But however docile and gentle the orang-outang may be, when taken young, and instructed, it is said to be possessed of great ferocity in its native state, and is considered as a dangerous animal, capable of readily overpowering the strongest man. Its swiftness is equal to its strength, and for this reason it is but rarely to be obtained in its full-

grown state, the young alone being taken.

The orang-outang now exhibiting at Exeter Change, is a native of Borneo, and is remarkable, not only on account of its extreme rarky, but as possessing, in many respects, a strong resemblance to man. What is technically denominated the cranium, is perfectly human in its appearance; the shape of the upper part of the head, the forehead, the eyes (which are dark and full), the eye-lashes, and, indeed, every thing relating to the eyes and ears, differing in no respect from man. The hair of his head, however, is merely the same which covers his body generally. The nose is very flat,—the distance between it and the mouth considerable; the chin, and, in fact, the whole of the lower jaw, is very large, and his teeth, twenty-six in number, are strong. The lower part of his face is what may be termed an ugly, or caricature, likeness of the human countenance. The position of the scapulæ, or shoulder-blades, the general form of the shoulders and breasts, as well as the figure of the arms, the elbow joint especially, and the hands strongly continue the resemblance. The metacarpal, or that part of the hand immediately above the fingers, is somewhat elongated; and, by the thumb being thrown a little higher up, nature seems to have adapted his hand to his mode of life, and given him the power of grasping more effectually the The fingers, both of the hands and feet, branches of trees. have nails exactly like those of the human race, with the exception of the thumb of the foot, which is without a nail.

He is corpulent about the abdomen, or, to employ the common phrase, rather pot-bellied, looking like one of those figures of Bacchus often seen riding on casks: but whether this is his natural appearance when wild, or acquired since his introduction into new society, and by indulging in a

high style of living, it is difficult to determine.

His thighs and legs are short and bandy, the ankle and heel like the human; but the fore-part of the foot is composed of toes, as long and as pliable as his fingers, with a

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thumb a little situated before the inner ankle; this conformation enabling him to hold equally fast with his feet as with his hands. When he stands erect, he is about three feet high, and he can walk, when led, like a child; but his natural locomotion, when on a plain surface, is supporting himself along at every step, by placing the knuckles of his hands upon the ground.

His natural food seems to be all kinds of fruits and nuts; but when he was embarked on board the Cæsar, the vessel which brought him to England, Mr. Mc Leod observes in his narrative already cited, he ate biscuit, or any other sort of bread, and sometimes animal food. He drank grog, and even spirits if given to him; and has been known repeatedly to help himself in this way: he was also taught to sip his tea or coffee : and since his arrival in England, has discovered a taste for a pot of porter. His usual conduct while on board was not mischievous, and chattering like that of monkies in general: but he had rather a grave and sedate character, and was much inclined to be social, and on good terms with every body. He made no difficulty, however. when cold or inclined to sleep, in supplying himself with any jacket he found hanging about, or in stealing a pillow from a hammock, in order to lie more soft and comfortably.

Some times, when teazed by shewing him something to eat, he would display, in a very strong manner, the human passions, following the person whining and crying, throwing himself off on his back, and rolling about apparently in a great rage, attempting to bite those near him, and frequently lowering himself by a rope over the ship's side, as if pretending to drown himself; but when he came near the water's edge, he always reconsidered the matter, and came on board again. He would often rifle and examine the pockets of his friends in quest of nuts and biscuits, which they sometimes carried for him. He had a great antipathy to the smaller tribe of monkeys, and would throw them overboard if he could; but in his general habits and dispositions there was much docility and good nature, and, when not annoyed, he was extremely inoffensive.

THE BEALTH.

per all grantequite the theory possesses the enemal persons returned and rectine the enemality in community to consecut with others or to ever appearing, a kind of arched saverns or domes, supported by a toundation of arched saverns and track or phisterial laterally with a supprising degree of sections and painters of actions.

The Auguston, or, as they are called, the as corrected would were cancer and an Kane, their in contact in the mounth, of Juga and July agreeded in numbers form all more, one a son formibe a time of two or three limited. If the waters no tr solucio they fix their exterior interior see that, and the next the alove their wellinger level, as in taken, they diego the with a touch to them; but in every or breaks, whose the wawere tree and tall, they countryed a leatek, and let then applied turns a mont, or place of mater, which remains afrea, at the same ladglet. The bank sparsper the siver, begin one the to the other like a slaver, and to entry term switer in a happing tree lane, his sen or excelve broad at the hour. This pole, for amounts of an antall a size, appears to the mirrouse, and engineer on mornible blues. but the onwilling with which the work is passentered in all more on mustaling time its magnitude. The parcel the even object show were the touch in generally abolting () they shot up the margin a large tree which can be made to tell into the water, they have with entiring it down, to during the paper chart part at their work. This tree is notice that has their the buly of a many that by generally as we first with the their control feeth, they are mightal that purpose in a very shore time, always mantitying that the tree doubt all a secthe river They must one the bounder them of the to make it for large. There operathermuse perfection the ton Section of the subject of the section of the sectio the long of the tree, after o traver a the image of the even. contains length, to make stakes of them, on the other times by fould to she margin of the piece, and townly are challed place where the hadding to carrying in Present they While some one labournes in this minutes, allo .

bring earth, which they plash with their fore-feet, and transport in such quantities, that they fill with it all the intervals between the piles. These piles consist of several rows of stakes, of equal height, all placed opposite to each other, and extend from one bank of the river to the other. The stakes facing the under part of the river are placed perpendicularly; but the rest of the work slopes upwards to sustain the pressure of the fluid, so that the bank, which is ten or twelve feet wide at the base, is reduced to two or three at the top.

The first great structure is made with a view to render their small habitations more commodious. These cabins. or houses, are built on piles near the margin of the pond, and have two openings, the one for going on the land, and the other to enable the beavers to throw themselves into the The form of these edifices is either oval or round. and their dimensions vary from four or five to eight or ten Some of them consist of three or four feet diameter. stories, and their walls are about two feet thick, raised perpendicularly on planks or plain stakes, which serve both for foundations and floors. They are built with amazing solidity, neatly plaistered both without and within, impenetrable to rain, and capable of resisting the most impetuous winds. The partitions are covered with a kind of stucco, as nicely plastered as if it had been executed by the hand of man. In the application of this mortar their tails serve for trowels, and their feet for plastering. They employ different materials, as wood, stone, and a kind of sandy earth, which is not subject to dissolution in water.

These most interesting animals labour in a sitting posture; and, besides the convenience of this situation, enjoy the pleasure of gnawing perpetually the wood and back of trees, substances most agreeable to their taste; for they prefer fresh back and tender wood to the greater part of their ordinary aliment. Of these provisions they lay up ample stores to support them during the winter; but they are not fond of dry wood, and make occasional excursions during the winter season for fresh provisions in the forests. They establish their magazines in the water, or near their habitations; and each cabin has its own, proportioned to the number of its inhabitants, who have all a common right to the store, and never pillage their neighbours. Some villages



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are confirmed of twenty or twenty from contine, they exist and distinguished are entry that his comment requirely white grant imar two tre inmities. The mail of Continuents. rain two, there, and as honeyers a mot the topons eighnesing eventy, and, it to alleged, convenient wirely. They are almost always uqually parred, there being the earns name two of transfer as of angles. When detect approximation, how were each other by willing the toll on the morner of the mater, the notice of which to beneat us a great distance may compile through all the vanits of their hald nations. I'veltaken like part some plange has the lake, ashers one at theories from within their malls, which can insly be to make end by the fire of heaven, in the asserted man, and white since sunnel withattempt althorte system or averture. They also more a long was made the for ; and it is the a that they go must easily robon, by at more attacking the carin, and matching at a hole made at some dimense, whicher they are obligated as expects for the purpose of respirations.

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tabular tip, by means of which the animal seizes insects with great ease, darting out his tongue in the manner of a wood-pecker, and retracting it instantaneously with the prey on its tip. It can also support a long abstinence, and hence arose the popular idea of the chameleon being nourished by air alone.

A very interesting account of the chameleon is given by Forbes in his Oriental Memoirs. This great curiosity, he remarks, is so common in India, that it is found in every thicket. He describes with great accuracy, and is the following terms, one which he kept for several weeks.

"The Chameleon of the Concan, including the tail, is about nine inches long; the body only half that length, varying in circumference, as it is more or less inflated; the head, like that of a fish, is immovably fixed to the shoulders; but every inconvenience is removed by the structure of the eyes, which, like spheres rolling on an invisible axis. are placed in deep cavities, projecting from the head: through a small perforation in the exterior convexity appears a bright pupil, surrounded by a yellow iris, which, by the singular formation and motion of the eye, enables the animal to see what passes before, behind, or on either side; and it can give one eye all these motions, while the other remains perfectly still: a hard rising protects these delicate organs; another extends from the forehead to the nostrils: the mouth is large, and furnished with teeth, with a tongue half the length of the body, and hollow like an elephant's trunk; it darts nimbly at thes and other insects, which it seems to prefer to the aerial food generally supposed to be its sustenance. The legs are longer than usual in the lacerta genus; on the fore-feet are three toes nearest the body, and two without; the hinder exactly the reverse; with these claws it clings fast to the branches, to which it sometimes entwines itself by the tail, and remains suspended: the skin is granulated like shagreen, except a range of bard excrescences, or denticulations, on the ridge of the back, which are always of the same colour as the body; whereas a row of similar projections beneath continue perfectly white, notwithstanding any metamorphosis of the animal.

"The general colour of the chameleon, so long in my possession, was a pleasant green, spotted with pale blue: from this it changed to a bright yellow, dark elive, and a

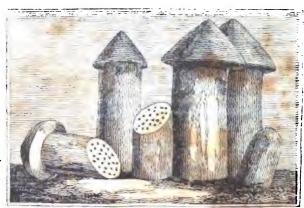
dull green; but never appeared to such advantage as when irritated, or a dog approached it.; the body was then considerably inflated, and the skin clouded like tortoise-shell, in shades of yellow, orange, green, and black. A black object always caused an almost instantaneous transformation; the room appropriated for its accommodation was skirted by a board painted black; this the chamelion carefully avoided; but if he accidentally drew near it, or if we placed a black hat in his way, he was reduced to a hideous skeleton, and from the most lively tints became black as jet; on removing the cause, the effect as suddenly ceased; the sable hue was succeeded by a bfilliant colouring, and the body was again inflated.

THE BOTTLE-NESTED SPARROW.

THE BAYA, OF BOTTLE-NESTED SPARROW, is remarkable for its pendent nest, brilliant plumage, and ancommon sagacity. These birds are found in most parts of Hindostan; in shape they resemble the sparrow, as also in the brown feathers of the back and wings; the head and breast are of a bright yellow, and in the rays of a tropical sun have a splendid appearance, when flying by thousands in the same grove; they make a chirping noise, but have no song: they associate in large communities and cover extensive clumps of palmyras, acacias, and date trees, with their nests. These are formed in a very ingenious manner, by long grass woven together in the shape of a bottle, with the neck hanging downwards, and suspended by the other end to the extremity of a flexible branch, the more effectually to secure the eggs and young brood from serpents, monkeys, squirrels, and birds of prey. These nests contain several apartments, appropriated to different purposes: in one the hen performs the office of incubation; another, consisting of a little thatched roof, and covering a perch, without a bottom, is occupied by the male, who, with his chirping note, cheers the female during her mater-The Hindoos are very fond of these birds, for their docility and sagacity: when young, they teach them to fetch and carry; and at the time the young women re-sort to the public fountains, their lovers instruct the baya



No. 54 .- Termites Ant Hills.



No. 55-Termites Pyramids.

as a family of a ser, the month ray of entrol that it a consistence is by some effecting the time except the month. It is consist, to consistence is extensibly at the ground once, and has no inside their with month down, with each entire them the locates at the great multime, in steam with ground. The engaged which the formula tays through now white, and in the observation when the formula tays through now white, and in the observation of the consistency in the series of the consistency in the consiste

thereights stay at the Brettle, Mr. Ferries should almost stall a beauty onling to the requirement of the charges, a thousand of the charges, a thousand of names absent to a compared to all the brilliances of temporal phonors, entire ad the arranges compare grower; and the humaning beauties another and much lovely of the trackets of the fermion distributes and the three phonors for trackets of the fermion of the first same little temporary for increases the fermion distributes, a first open only of their which, from the pathonors in collect the trackets of the tell and logs are out that the tento a part to local, initial of the phony set, versus after that a part to local, initial of the phony set, versus after the every manual and stands of green and purple, the linears to me bright Baine resource a tricingul with others, and spatitud with gold.

Guinul Birms' maria.

A minor the interesting subjects which still remain open (a) treated, are the habits and constitutional the tipicals grant reset, the entill weather which ments the entitle make, immedia a ported in large quantities from Java and the vectors related in the Chinese market. These firsts to receive the filles character, in his instens of Java, and only about among the cliffs and arranges of the earth major of the manufacture and title industry in Java, and only its industry and carreers of a year of the manufacture and title II (in minutes of the cause). From a very about and title II (in minutes of the cause). From a very about and title in minute has been greated as the course of the cause of the ca

from the sea, containing nests similar to those on the shore. From many of their retreats along the southern coast, they have been observed to take their flight in an inland direction, towards the pools, lakes, and extensive marshes.covered with stagnant water, as affording them abundance of their food, which consists of flies, musquitoes, gnats, and small insects of every description. The sea, which washes the foot of the cliffs, where they most abound, is almost always in a state of the most violent agitation, and affords none of those substances which have been supposed to constitute the food of the esculent swallow. Another species of swallow in the island of Java, forms a nest, in which grass, moss, &c. are merely agglutinated by a substance exactly similar to that of which exclusively the edible nests consist. This substance, from whatever part of those regions the nests be derived, is essentially uniform, differing only in the colour, according to the relative age of the nests. It exhibits none of those diversities which might be expected, if, like the mud employed by the martin, and the materials commonly used in nest-making, it were collected casually, and applied to the rocks. Were it to consist of the substances usually supposed, it would be putrescent and diversified.

THE MIGRATION OF BIRDS.

Yea, the stork in the heavens knoweth her appointed times; and the turtle, and the crane, and the swalkow, observe the time of their coming.

JERRMIAH.

Who bids the stork, Columbus like, explore
Heavens not his own, and worlds unknown before?
Who calls the council, states the certain day?
Who forms the phalanx, and who points the way?
POPE.

The migration of birds, which is common to the quail, the stork, the crane, the fieldfare, the woodcock, the cuckoo, the martin, the swallow, and various others, is justly considered as one of the most wonderful instincts of nature. Two circumstances, Doctor Derham observes, are remarkable in this migration: the first, that these uninstructed creatures should know the proper times for their passage, when to come, and when to go, some departing while sthers

arrest pure, according that they about know which may be also their graves, and whither to so,

High of passing actual possibility accommodated, by the emisting of their pass, the line, flights; and it is remarked. that, in that interaction they observe a wonderful galer and padity; they fix in transparent some the a course, without the add at compact, to your authorized regions. The Berlie of wild game, in a mortgadike figure, has eiter been observed; and it has been more of that the these forestient, who were too comment the decrease behind, and are relieved by others, a paare again assected by the rest in order. At the appropria of winger the wild due bound entace of the twith fly his quiet. of more formatches chemica. They all consulty, as a recarn day, like aveallows and quarts, decompany or the came there. Then Right is highly current, they presently range discussed to a line which the unit, or to tree lines arrand in a point, like a V reserved. It is admirously bloom, in has travels, that stocks, about a formight believe they perfrom one country to another, assistantly count together from all the electromacous parts, to a contain plain, and there have ing themselves daily into what, is the preparate physical in, salted a class witness description the seast time of that the partore, and the places of their laters abody.

Switters have often been observed, in huma make flooks, on churches, rocks, and trees, provincely to their deporture from Great Britain; and their return, in apparently equal quinbers, has been witnessed to a voticely of Instances. In Sweden, the starling, hading, after the mobile of manners, that worms are less plentint, purs annually into France. Germany, and Dunmark. The female chaftenhas, every wanter about Michaelana, go to the he to Holland, but us the makes may in Service. The bounded come teach to the spring, receipt such as do not classe to havel any langue. In the rapic incomer, the female Carolina , eller discount, in the month of September, while the rive in which she werls to lead up to groundles, goes (no side the could, and returns to the encion to wel her more. The agreete little of he much see hered by morely in the borned the worth very automor locates the mater is true as. They she lakes

Pedand and Latinoppe are tilled achieved and court the companies of ulpulations that go in foreign is to always for the Lo. The same way. See the

beginning of spring, however, as soon as the heat of the sun molests them, they return back, and again frequent the borders of the springs and lakes, where the females deposit their eggs; for there, and especially in Lapland, a vast abundance of gnats—insects which live in the water before they get their wings—afford them an excellent nourishment. By these migrations, birds become useful to many countries, and are distributed over almost every part of the globe.

THE TERMITES, OR WHITE ANTS. [See Plates, No. 54, 55.]

Or these very surprising insects naturalists describe four species, the largest of which is the TERMES BELLICOSUS. or BELLIGERENT TERMITE. The nests of these insects are large handsome pyramids, ten or twelve feet and upwards above the surface of the earth, and as many beneath it. The second species is named the FATAL TERMITE, the nests of which are likewise of a pyramidal form, but neither so lofty nor extensive as the former. Its ravages, however, are more fatal, and its punctures more painful and dangerous. The BITING TERMITE forms the third species, and constructs its nest in the form of a cylindrical turret, four feet high, and The turret is covered with a conical one in diameter. roof, which projects some inches over, and beyond the building, doubtless to prevent it from being injured by the The DESTROYING TERMITE CONSTitutes the fourth species, and constructs spherical nests round the branch of a tree, which passes entirely through them.

The TERMES BELLICOSUS, according to Mr. Smeathman, whose account has appeared in the Philosophical Transactions, constructs works which surpass those of the bees, wasps, beavers, and other animals, as much at least as those of the most polished European nations excel those of the least cultivated savages. Even with regard to man, his greatest works, the boasted pyramids, fall comparatively far short, even in size alone, of the structures raised by these insects. The labourers among them employed in this service are not a quarter of an inch in length; but the structures which they erect, rise, as has already been observed, to the height of ten or twelve feet and upwards above the surface of the earth. Supposing the height of a man to be six feet, this author calculates, that the

of these insects may be considered, relatively to their size, and that of a man, as being raised to nearly five times the height of the greatest of the Egyptian pyramids; that is, corresponding with considerably more than half a mile. It may be added, that, with respect to the interior construction, and the various members and dispositions of the parts of the buildings, they appear greatly to exceed that,

or any other work of human construction.

The most striking parts of these structures are, the royal apartments, the nurseries, magazines of provisions, arched chambers and galleries, with their various communications; the ranges of the gothic-shaped arches, projected, and not formed by mere excavation, some of which are two or three reet high, but which diminish rapidly, like the arches of aisles in perspectives; the various roads, sloping staircases, and bridges, consisting of one vast arch, and constructed to shorten the distance between the several parts of the building, which would otherwise communicate only by winding passages. In the plate, a section is given of one of these surprising mounds or ant hills; and likewise the section of a pyramid surmounted by its conical roof. In some parts near Senegal, the number, magnitude, and closeness of these structures, make them appear like the villages of the natives.

The economy of these industrious insects is equally curious with the plan and arrangement of the interior of their buildings. There are three distinct ranks or orders among them, constituting a well regulated community. These are, first, the labourers, or working insects; next, the soldiers, or fighting order, who abstain from all labour, and are about twice as long as the former, and equal in bulk to about fifteen of them; and, lastly, the winged, or perfect insects, which may be styled the nobility or gentry, of the state; for they neither labour nor fight, being scarcely capable even of self-defence. These alone are capable of being elected kings or queens; and it has been so ordained by nature, that they emigrate within a few weeks after they are elevated to this state, and either establish new kingdoms or perish in the space of one or two days.

The first order, the working insects, are most numerous, being in the proportion of one hundred to one of the soldiers. In this state they are about a quarter of an inch.

long, and twenty-five of them weigh about a grain, so that they are not so large as some of the ants of Europe.

The second order, or soldiers, have a very different form from the labourers, and have been by some authors supposed to be the males, and the former the neuters; but they are, in reality, the same insects as the foregoing, only that they have undergone a change of form, and approached one

degree nearer to the perfect state.

The third order, or the insect in its perfect state, varies its form still more than ever, differing in every essential part from the labourers and soldiers; besides which, it is now furnished with four fine, large, brownish, transparent wings, with which it is, at the time of emigration, to wing its way in search of a new settlement. The difference is, indeed, so great, that these perfect insects have not, until recently, been supposed to belong to the same community with the others, and are not to be discovered in the nest until just before the commencement of the rainy season, when they undergo the last change, which is preparative to the formation of new colonies. They are equal in bulk to two soldiers and about thirty labourers; and, with the aid of their wings, roam about for a few hours, when their wings fall off, and they become the prey of innumerable birds, reptiles, and insects. Hence it happens that scarcely a pair of the many millions of this unhappy race, find a place of safety, to fulfil the first law of nature, and lay the foundation of a new community. In this state many fall into the neighbouring waters, and are eaten with avidity by the Africans, who roast them in the manner of coffee, and find them delicate, nourishing, and wholesome.

The few fortunate pairs who survive this annual massacre and destruction, being casually found by some of the labourers, who are constantly running about on the surface of the ground, are elected kings and queens of new states. Those who are not so elected and preserved, certainly perish, and most probably in the course of the following day. By these industrious creatures the king and queen elect are immediately protected from their innumerable enemies, by inclosing them in a chamber of clay, where the propagation of the species soon commences. Their voluntary subjects then busy themselves in constructing wooden nurseries, or apartments solely composed of sood-

en materials, seemingly joined together with gums. Into these they afterwards carry the eggs produced by the queen, lodging them as fast as they can obtain them from her. Plausible reasons are given by Mr. Smeathman for the belief he entertains, that they here form a kind of garden for the cultivation of a species of microscopical mushroom; and in this belief he is supported by Mr. Konig, in his essay on the East-Indian termites, by whom also this is conjectured to be the food of the young insects. But perhaps the most wonderful, at the same time best authenticated, part of the history of these curious insects, is that which relates to the queen, or mother of the community in her pregnancy.

After impregnation, a very extraordinary change begins to take place in her person, or rather in her abdomen only. It gradually increases in bulk, and at length becomes of such an enormous size as to exceed the bulk of the rest of her body 1500 or 2000 times. She becomes 1000 times heavier than her consort, and exceeds 20,000 or 30,000 times the bulk of one of the labourers. In this state 80,000 eggs (for they have been counted) are protruded in twenty-four hours. They are instantly taken from her body by the attendants. a sufficient number of whom are constantly in waiting in the royal chambers, and adjacent galleries, and carried to the nurseries, which are sometimes four or five feet distant in a straight line. Here, after they are hatched, the young are attended and provided with every thing necessary, until they are able to shift for themselves, and take their share in the labours of the community.

Many curious and striking particulars are related of the great devastations committed by this powerful community, which construct roads, or rather covered ways, diverging in all directions from the nest, and leading to every object of plunder within their reach. Though the mischiefs they commit are very great, such is the economy of nature, that they are probably counterbalanced by the good produced by them, in quickly destroying dead trees and other substances, which would otherwise, by a tedious decay, serve only to encumber the face of the earth. Such is their alacrity and dispatch in this office, that the total destruction of deserted towns is accomplished in two or three years, and their space filled by a thick wood, not the least vestige of a house remaining.

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At Bombay, Mr. Forbes observes in his memoirs, they are so numerous and destructive that it is difficult to guard against their depredations: in a few hours they will demolish a large chest of books, papers, silk, or clothes, perforating them with a thousand holes: the inhabitants dare not leave a box on the floor without placing it on glass bottles, which, if kept free from dust, they cannot ascend: this is trifling, when compared with the serious mischief they sometimes occasion, penetrating the beams of a house, or destroying the timbers in a ship.

These destructive animals advance by myriads to their work, under an arched incrustation of fine sand, tempered with a moisture from their body, which renders the covertway as hard as burnt clay, and effectually conceals them in

their insidious employment.

Mr. Forbes, on his departure from his residence at Anjengo, to pass a few weeks at a country retirement, locked up a room containing books, drawings, and a few valuables; as he took the key with him, the servant could not enter to clean the furniture: the walls of the room were white-washed, and adorned with prints and drawings, in English frames and glasses: returning home in the evening, and taking a cursory view of his cottage by candle light, he found every thing apparently in the same order as he left it: but on a nearer inspection the next morning, he observed a number of advanced works, in various directions, towards his pictures; the glasses appeared to be uncommonly dull. and the frames covered with dust: on attempting to wipe it off, he was astonished to find the glasses fixed to the wall. not suspended in frames as he left them, but completely surrounded by an incrustation cemented by the white ants. who had actually eaten up the deal frames and back-boards. and the greater part of the paper, and left the glasses upheld by the incrustation, or covered-way, which they had formed during their depredation. From the flat Dutch bottles, on which the drawers and boxes were placed, not having been wiped during his absence, the ants had ascended the bottles by means of the dust, eaten through the bottom of a chest, and made some progress in perforating the books and linen.

The different functions of the labourers and soldiers, or the civil and military establishments, in a community of white ants, are illustrated by Mr. Smeathman in an attempt to

examine their nest or city. On making a breach in any part of this structure with a hoe or pick-axe, a soldier immediately appears, and walks about the breach, as if to see whether the enemy is gone, or to examine whence the attack proceeds. In a short time he is followed by two or three others, and soon afterwards by a numerous body, who rush out as fast as the breach will permit them, their numbers increasing as long as any one continues to batter the building. During this time they are in the most violent bustle and agitation; some being employed in beating with their forceps upon the building, so as to make a noise which may be heard at three or four feet distance. On ceasing to disturb them the soldiers retire, and are succeeded by the labourers, who hasten in various directions towards the breach, each with a burden of mortar in his mouth ready tempered. Though there are millions of them, they never stop or embarass each other; and a wall gradually arises to fill up the chasm. A soldier attends every 600 or 1000 of the labourers, seemingly as a director of the works; for he never touches the mortar, either to lift or to carry it. One in particular places himself close to the wall under repair. and frequently makes the above-mentioned noise, which is constantly answered by a loud hiss from all the labourers within the dome: and at every such signal, they evidently redouble their pace, and work as fast again.

The work being completed, a renewal of the attack constantly produces the same effects. The soldiers again rush out, and then retreat, and are followed by the labourers loaded with mortar, and as active and as diligent as before. Thus the pleasure of seeing them come out to fight or work alternately, Mr. Smeathman observes, may be obtained as often as curiosity excites, or time permits; and it will certainly be found that the one order never attempts to fight, nor the other to work, let the emergency be ever so great. The obstinacy of the soldiers is remarkable: they fight to the very last, disputing every inch of ground so well as often to drive away the negroes, who are without shoes, and make white people bleed plentifully through

their stockings.

Such is the strength of the buildings erected by these puny insects, that when they have been raised to little more than balf their height, it is the constant practice of the African

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wild bulls to stand as centinels upon them, while the rest of the herd are ruminating below. When at their full height of ten or twelve feet, they are used by Europeans as lookout stations whence they can see over the grass, which in Africa is on an average of the height of thirteen feet. Four or five persons may stand on the top of one of these buildings to look out for a vessel the approach of which is expected.

THE BEE.

To their delicious task the fervent bees,
In swarming millions tend: around, athwart,
Through the soft air, the busy nations fly,
Cling to the bud, and with inserted tube,
Suck its pure essence, its ethereal soul;
And oft, with bolder wing, they soaring dare
The purple heath, or where the wild thyme grows,
And yellow load them with the luscious spoil.

THOMSON.

The wisdom of the bees, the perfection and harmony of their government, their persevering industry, and their wonderful economy, have been celebrated by the natural historians of every age. Indeed, the skill and dexterity displayed by the honey bees, in the construction of their combs or nests are truly wonderful. These are composed of cells regularly applied to each other's sides, and uniformly of an hexagonal or six-sided figure. In a bee-hive, every part is arranged with such symmetry, and so finely finished, that, if limited to the same materials, the most expert workman would find himself unqualified to construct a similar habitation, or rather a similar city.

In the formation of their combs, bees seem to have resolved a problem which would perplex geometers not a little; name y, a quantity of wax being given, to make of it equal and similar cells of a determined capacity, but of the largest size in proportion to the quantity of matter employed, and disposed in such a manner as to occupy in the hive the least possible space. Every part of this problem is completely executed by the bees. By applying hexagonal cells to each other's sides, not any void spaces are left between them; and, although the same end might be accomplished by other figures, yet they would necessarily require a greater quantity of wax. Hexagonal cells are, besides, better fitted

to receive the cylindrical bodies of these insects. A comb being made to consist of two rows of cells applied to each other's ends, this arrangement both saves room in the hive, and gives a double entry into the cells of which the comb is composed. As a further saving of wax, and for the prevention of void spaces, the bases of the cells in one row of a comb serve for bases to the opposite row. In a word, the more minutely the construction of these cells is examined, the more is the admiration of the observer excited. Their walls are so extremely thin, that the mouths of the bees would, in entering and passing out continually, be in danger of suffering; to prevent which, a kind of ring, three or four times thicker than the walls, is formed round the

margin of each cell.

The mode in which bees operate, when constructing their cells, is not easily to be traced, even with the help of glass hives. They are so eager to afford mutual assistance, and for this purpose so many of them crowd together, and are perpetually succeeding each other, that their individual operations can seldom be distinctly observed. It has, however, been fully ascertained that, in modelling and polishing the wax, they do not employ any other instruments besides their two teeth. With a little patience and attention, cells may be perceived just begun; and the celerity with which a bee moves its teeth against a small proportion of one of these cells, may also be remarked. The little animal, by repeated strokes on each side smooths this portion, renders it compact, and reduces it to a proper thinness of consistence. While some of the hive are lengthening their hexagonal tubes, others are laying the foundations of new ones. When a bee puts its head a little way into a cell, it may easily be perceived to scrape the walls with the points of its teeth, in order to detach such useless and irregular fragments as may have been left in the work. Of these fragments it forms a ball about the size of a pin's head, comes out of the cell, and carries the wax to another part of the work where it is needed. It no sooner leaves the cell, than it is succeeded by another bee, which performs the same office; and in this manner the work is carried on till the cell is completely polished.

The cells are designed for different purposes, some being employed for the accumulation and preservation of honey,

while in others the female deposits her eggs, from which worms are hatched, to remain in the cells until their final transformation into winged insects. The drones or males are larger than the common working bees; and the queen, or mother of the hive, is much larger than either. A cell destined for the lodging of a male or female worm must therefore be considerably larger than the cell of the smaller working bees. Those destined for the reception of the working bees are far more numerous than those in which the males are lodged. The honey-cells are always made deeper and more capacious than the others. When the honey collected is so abundant that the receptacles cannot contain it, the bees lengthen, and consequently deepen the honey-cells.

Bees, when placed in an empty hive, display the highest sagacity, as well in their mode of working, as in the disposition and division of their labour. They immediately begin to lay the foundations of their combs, a task which they execute with great quickness and alacrity. after having begun to construct one comb, they divide themselves into two or three companies, each of which, in a different part of the hive, is occupied with the same labours. By this division of the task, a greater number of bees find employment at the same time, and, consequently, the common work is sooner finished. The combs are generally arranged in a direction parallel to each other, an interval, or street, being always left between them, that the bees may have a free passage, and an easy communication with the different combs in the hive. These streets are wide enough to allow two bees to pass each other: and there are, besides, several round cross passages, always covered, to shorten their journies when working.

By the means of their hinder thighs, bees carry into their hives great quantities of the farina or dust of flowers, which, after having been thus industriously collected, becomes their food, and is, by an animal process, converted into wax. This digestive process, which is necessary to the formation of that substance, is carried on in the second stomach, and perhaps in the intestines of bees. Reamur, to whom the merit of this discovery is due, likewise ascertained that all the cells in a hive are not destined for the reception of honey, and for depositing the eggs of the fe-

male, but that some of them are employed as receptacles for the farina of flowers, which is the great basis and raw material of all their curious operations. When a bee comes to the hive with its thighs filled with farina, it is often met near the entrance by some of its companions, who first take off the load, and then devour the provisions so kindly brought to them. But when the members of the community are no longer oppressed by hunger, the carriers of the farina deposit their loads in cells prepared for that purpose. To these cells the bees resort, when the weather is so bad that they cannot venture into the fields to seek a fresh supply of food. The farina being digested, and converted into wax, the bees possess the faculty of bringing it from the stomach to the mouth, employing the tongue, which is placed beneath the two teeth, or fangs, in supplying the materials for the construction of their waxen cells. When at work, this member is in perpetual and rapid motion; being at times more or less concave, and partly covered with a moist paste or wax. By its different movements the bee continues to supply fresh wax to the teetli, which are employed in raising and fashioning the walls of its cell, till they have acquired a sufficient height. The moist paste or wax is no sooner dry, than it assumes all the apnearances of common wax.

Bees not only require much warmth, but are also extremely solicitous to prevent other insects from an entrance into their hives. To accomplish both these purposes, when they take possession of a new hive, they carefully examine every part of it, and, if they discover any small holes or chinks, paste them firmly with a resinous substance collected from various trees, as poplars, birches, and willows, differing entirely from wax, more durable, and more capable of resisting the vicissitudes of weather. A bee having procured a sufficient quantity of this purely natural production, to fill the cavities of its two hinder thighs, repairs to the hive, where two of its companions are in readiness to draw out the glue, and apply it to fill up such chinks, holes, or other deficiencies, as they find in their habitation. This is not, however, the only use to which bees apply the They are extremely solicitous to remove such insects, or foreign bodies, as chance to introduce themselves into the hive. When so light as not to exceed their powers, they first kill the insect with their stings, and then drag it out with their teeth. But it sometimes happens that a snall creeps into the hive; in which case it is no sooner perceived, than it is attacked on all sides, and stung to death. The bees being unable to carry out a burden of such a weight, to prevent so large a body from diffusing a disagreeable odour through the hive, instantly cover every part of it with glue, through which not any effluvia can escape. When a snail with a shell finds an entrance, the bees have less trouble, since it naturally retires within its shell, on receiving the first wound from a sting. In this case, the bees, instead of glueing it all over, satisfy themselves with passing the glue round the margin of the shell, which renders the animal immovably fixed.

Bees being prevented by the weather, not only during the winter, but on many summer days, from going abroad in quest of provisions, collect and amass, in cells destined for that purpose, large quantities of honey, which they extract, by means of their proboscis or trunk, from the nectariferous glands of flowers. After collecting a few small drops, the animal, with its proboscis, conveys them to its mouth, and swallows them. From the gullet, the honey passes into the first stomach, which is more or less swollen in proportion to the quantity of honey it contains. When filled, the bee returns to the hive, and disgorges in a cell the honey it has collected. It occasionally happens, however, that it is accosted on its way by a hungry companion. How the latter communicates its necessity to the other, remains to be discovered; but the fact is certain, that when two bees, thus circumstanced, meet, the one which is laden extends its trunk, opens its mouth, and, like ruminating animals, forces up the honey into that cavity. The hungry bee knows how to take advantage of this hospitable invitation, and, with the point of its trunk, sucks the honey from the other's mouth. In the same way, the loaded bee, on reaching the hive, offers its honey to those who are at work, as if to save them the necessity of quitting their labour to proceed in quest of food. In bad weather, the bees feed on the honey laid up in open cells; but never touch these reservoirs when their companions are enabled to supply them with fresh honey from the fields. But the mouths of those cells which are destined to preserve the

honey for winter's use, are carefully covered with a lid or

thin plate of wax.

The honey bees not only labour in common with astonishing assiduity and art, but their whole attention and affections seem to centre in the person of THE QUEEN OF SOVEREIGN of the hive. She is the basis of their association, and of all their operations. When she dies by any accident, disorder ensues throughout the community: all labour ceases; there is an end to the construction of new cells, as well as to the collection of either honey or wax. In this state of anarchy the bees remain, until a new queen or female is obtained, to effect which they have the power of selecting one or two grubs of workers, and converting them into queens. This they accomplish by greatly enlarging the cells of the selected larvas, by supplying them more copiously with food, and that of a more pungent kind than is given to the common larvas.

The government or society of bees is therefore more of a monarchial than of a republican nature. All the members of the state seem to respect and be directed by a single femule. This fact affords a strong instance of the force and wisdom of nature. The female is the mother of the whole hive, however numerous; and without her the species could not be continued. Nature has therefore endowed the rest of the hive with a wonderful affection to their common parent. For the reception of her eggs nature impels them to construct cells, and to lay up stores of provisions for winter subsistence. These operations proceed from pure instinctive impulses it is true, but every instinct necessarily supposes a degree of intellect, a principle to be acted upon, otherwise not any impulsion could be felt, nor could either action or mark of intelligence possibly be produced.

duced.

On the subject of swarms, the following are the conclusions drawn by M. Huber, who has paid particular attention to the economy and habits of bees. First: a swarm is always led off by a single queen, either the sovereign of a parent hive, or one recently brought into existence. If, at the return of spring, a well-peopled hive, under the government of a fertile queen, be examined, she will be seen to lay a prodigious number of male eggs in the course of the month of May, and the workers will choose that moment

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for constructing several royal cells. Secondly: when the larvas hatched from the eggs, laid by the queen in the royal cells, are ready for a transformation into nymphs, this queen leaves the hive, conducting a swarm along with her; and the first swarm that leaves the hive is uniformly conducted by the old queen. Lastly: after the old queen has conducted the first swarm from the hive, the remaining bees take particular care of the royal cells, and prevent the young queens successively hatched, from leaving them inless at an interval of several days between each.

TRANSFORMATION OF INSECTS.

Nature's smallest products please the eye, While greater births pass unregarded by, Her monsters seem a violence to sight: They're form'd for terror, insects to delight. Thus, when she nicely frames a piece of art, Fine are her strokes, and small in every part. No labour can she boast more wonderful Than to inform an atom with a soul; To animate her little beauteous fly, And clothe it in her gaudiest drapery.

YALDEN.

those which are destitute of wings, have to pass through several changes before they arrive at the perfection of their natures. The appearance, the structure, and the organs of a caterpillar, a crysalis, and a fly, are so different, that to a person unacquainted with their transformations, an identical animal would be considered as three distinct species. Without the aid of experience, who could believe that a butterfly, adorned with four beautiful wings, furnished with a long spiral proboscis, instead of a mouth, and with six legs, proceeded from a disgusting caterpillar, provided with jaws and teeth, and fourteen feet? Without experience, who could imagine that a long, white, smooth, soft worm, hid under the earth, should be transformed into a black crustaceous beetle, having wings covered with horny cases?

Besides their final metamorphosis into flies, caterpillars undergo several intermediate changes. All caterpillars cast or change their skins more or less frequently according to the

species. The silkworm, previous to its chrysalis state casts The first skin is cast on the 10th, 11th. its skin four times. or 12th day, according to the nature of the season; the second in five or six days after; the third in five or six days more: and the fourth and last in six or seven days af-This changing of skin is not only common to all caterpillars, but to every insect whatever. Not one of them arrives at perfection without casting its skin at least The skin, after it is cast, preserves so enonce or twice. tirely the figure of the caterpillar in its head, teeth, legs, colour, hair, &c. that it is often mistaken for the animal itself. A day or two before this change happens, caterpillars take no food; they lose their former activity, attach themselves to a particular place, and bend their bodies in various directions, till, at last, they escape from the old skin, and leave it behind them. The intestinal canal of caterpillars is composed of two principal tubes, the one inserted in the other: the external tube is compact and fleshy; but the internal one is thin and transparent. Some days before caterpillars change into the chrysalis state, they void, along with their excrement, the inner tube which lined their stomach and intestines. When about to pass over into the chrysalis state, which is a state of imbecility, they select the most proper places and modes of concealing themselves from their enemies. Some, as the silkworm and many others, spin silken webs or cords round their bodies, which completely disguise the animal form. Others leave the plants upon which they formerly fed, and hide themselves in little cells which they make in the earth. The rat-tailed worm abandons the water upon the approach of its metamorphosis. retires under the earth, where it is changed into a chrysalis, and, after a certain time, bursts from it seemingly inanimate condition, and appears in the form of a winged insect. Thus the same animals pass the first and longest period of their existence in the water, another under the earth, and the third and last in the air. Some caterpillars, when about to change into a chrysalis state, cover their bodies with a mixture of earth and of silk, and conceal themselves in the loose soil. Others incrust themselves with a silky or glutinous matter, which they push out from their mouths, without spinning it into threads. Others retire into the holes of walls or decayed trees. Others suspend themselves to the twigs of trees, or to other elevated bodies, with their heads undermost. Some attach themselves to walls, with their heads higher than their bodies, but in various inclinations: and others choose a horizontal position. Some fix themselves by a gluten, and spin a rope round their middle to prevent them from falling. Those which feed upon trees attach themselves to the branches, instead of the leaves, which are less durable, and subject to a variety of accidents. The colours of the caterpillar give no idea of those of the future flies.

The metamorphosis of insects has been regarded as a sudden operation, because they often burst their shell or silky covering quickly, and immediately appear furnished with wings. But by more attentive observation, it has been discovered, that the transformation of caterpillars is a gradual process from the moment the animals are hatched till they arrive at a state of perfection. Why, it may be asked, do caterpillars so frequently cast their skins? The new skin, and other organs, were lodged under their old ones, as, in many tubes or cases, and the animal retires from these cases, because they have become too strait. The reality of these encasements has been demonstrated by a simple experiment. When about to molt or cast its skin, if the foremostlegs of a caterpillar are cut off, the animal comes out of the old skin deprived of these legs. From this fact, Reaumur conjectured, that the chrysalis might be thus encased. and concealed under the last skin of the caterpillar. discovered that the chrysalis, or rather the butterfly itself, was inclosed in the body of the caterpillar. The proboscis. the antennæ, the limbs, and the wings of the fly, are so nicely folded up, that they occupy a small space only under the first two rings of the caterpillar. In the first six limbs of the caterpillar, are encased the six limbs of the butterfly. Even the eggs of the butterfly have been discovered in the caterpillar long before its transformation.

From these facts it appears, that the transformation of insects is only the throwing off external and temporary coverings, and not an alteration of the original form. Caterpillars may be considered as analogous to the fetuses of men and of quadrupeds. They live and receive nourishment in envelopes till they acquire such a degree of perfection as enables them to support the situation to which

they are ultimately destined by Nature.

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ZOOPHITES, OR PLANT-ANIMALS.

THESE wonderful productions are so denominated on account of their existing in the shape of plants. They are very numerous, and the greater part of them have so great a resemblance to vegetables, that they have generally been considered as such, although the horny and stony appearance of several of the tribe declares them at first view, to be of a widely different nature from the generality of plants. In others, however, the softness of their substance, and the ramined mode of their growth, would lead any one not acquainted with their real nature, to suppose them vegetables. The hard, horny, or stony zoophites are in general known by the name of corals; and of these several distinctions ara formed, either from the structure and appearance of the coral or hard part, or from the affinity which the softer, or animal part, bears to some other genus among soft-bodied animals, or mollusca. The zoophites may be therefore said to unite the animal and vegetable kingdoms, so as to fill up the intermediate space.

Belonging to the class of zoophitic-worms, the fresh-water polypes are infinitely curious. These animals may be found in small streams, and in stagnant waters, adhering to the stems of aquatic plants, or to the under surface of the leaves, and other objects. If a polype be cut in two parts, the superior part will produce a new tail, and the inferior part. a new head and arms; and this, in warm weather, in the course of a very few days. If cut into three pieces, the middle portion will produce both the head and tail; and in short, polypes may be cut in all directions, and will still reproduce the deficient organs. The natural mode of propagation in this animal, is by shoots or offsets, in the manner of a plant: one or more branches or shoots proceed from the parent stem, dropping off when complete; and it often happens that these young branches produce others before they themselves drop off from the parent; so that a polype may be found with several of its descendants still adhering to its stem, thus constituting a real genealogical tree. The polype likewise, during the autumnal season, deposits eggs, which evolve themselves afterwards into distinct animals :

and thus possesses two modes of multiplication. It seems paradoxical that a polype should be able to swallow a worm three or four times as large as itself, which is frequently observed to happen; but it must be considered that the body of the animal is extremely extensile, and that it possesses, in an extraordinary degree, the power of stretching itself according to the size of the substance it has to swallow. It seizes its prey with great eagerness, but swallows it slowly, in the same manner as a snake swallows any small quadruped. The arms of a polype, when microscopically examined, are found to be furnished with a vast number of small organs, apparently acting like so many suckers. by the means of which the animal can hold a worm, even though but slightly in contact with one of its arms; but when on the point of swallowing its prey, it then makes use of all its arms at once, in order to absorb it the more readily.

Corals on being gathered perfectly fresh, and placed in sea water, appear to put forth small flowers from all the minute cavities, or hollow points, on the surface. These supposed flowers (for such an idea has been entertained) are real animals; and consequently corals are to be considered as aggregates of animals, either forming, or at least inhabiting, the calcareous substance of the corai in which The smaller corals, commonly known by they appear. the name of corallines, or sea mosses, are so many ramified sea-polypes, covered with a kind of strong, horny case, to defend them from the injuries to which they would be liable, in the hoisterous element destined for their abode. harder, or stony corals are equally of an animal nature; the entire coral continuing to grow as an animal, and to form, by secretion, the stronger or horny exterior, which may at once be considered as its bone, and the habitation in which it has constantly to dwell. A coral of this kind is, therefore, a large compound zoophite, springing up from the rock, in which it seems to have taken root, and shooting out into branches like a vegetable production.

Sponges afford another curious instance of zoophitic life. There are forty-nine species of this zoophite, each of which is characterised in the Linnean system as a fixed animal, flexile, torpid, of various forms, composed either of reticulate fibres, or masses of small spines interwoven togeth-

er, and clothed with a gelatinous flesh, full of small mouths on its surface, by which it absorbs and rejects water. The existence of the animal inhabitant within its cell has been satisfactorily ascertained by the observations and experiments of Ellis on the spongia tormentosa. He remarked its contraction when exposed to pain or injury, as well as the expiration and inspiration of water through its tubes. He thus established the position that sponge is an animal, and that the ends or openings of the branched tubes are the mouths by which it receives its nourishment, and discharges its excremintitious matter. This position chemistry has since abundantly supported, by proving the ammoniacal property of the cellular substance of sponge.

THE BANIAN TREE.

[See Plate, No. 26.]

PROCEEDING to the vegetable kingdom, the BANIAN, or BURR TREE, the ficus indica of Linners, claims a particular attention. It is considered as one of the most curious and beautiful of nature's productions in the genial climate of India, where she sports with the greatest profusion and variety. Each tree is in itself a grove, and some of them are of an amazing size, as they are continually increasing, and, contrary to most other animal and vegetable productions, seem to be exempted from decay: for every branch from the main body throws out its own roots, at first in small tender fibres, several yards from the ground, which continually grow thicker; until by a gradual descent, they reach its surface; where, striking in, they increase to a large trunk, and become a parent tree, throwing out new branches from the top. These in time suspend their roots, and, receiving nourishment from the earth, swell into trunks. and shoot forth other branches; thus continuing in a state of progression so long as the first parent of them all supplies her sustenance.

A banian tree with many trunks, forms the most beautiful walks, vistas, and cool recesses, that can be imagined. The leaves are large, soft, and of a lively green; the fruit is a small fig, when ripe of a bright scarlet; affording sustenance to monkeys, squirrels, peacocks, and birds of va-

rious kinds, which dwell among the branches.

The Hindoos are peculiarly fond of this tree: they con-

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sider its long duration, its out-stretching arms, and overshadowing beneficence, as emblems of the Deity, and almost pay it divine honours. The Brahmins, who thus "find a fane in every sacred grove," spend much of their time in religious solitude under the shade of the banian-tree; they plant it near the dewals, or Hindoo temples, improperly called pagodas; and in those villages where there is not any structure for public worship, they place an image under one of these trees, and there perform a morning and evening sacrifice.

These are the trees under which a sect of naked philosophers, called Gymnosophists, assembled in Arrian's days; and this historian of ancient Greece, it is observed by Forbes, in his Oriental Memoirs, affords a true picture of the modern Hindoos. "In winter the Gymnosophists enjoy the benefit of the sun's rays in the open air; and in summer, when the heat becomes excessive, they pass their time in cool and moist places, under large trees; which according to the accounts of Nearchus, cover a circumference of five acres, and extend their branches so far, that ten thou-

sand men may easily find shelter under them.

On the banks of the Narbudda, in the province of Guzzerat, is a banian tree, supposed by some persons to be the one described by Nearchus, and certainly not inferior to it. It is distinguished by the name of the Cubbeer Burr, which was given to it in honour of a famous saint. High floods have, at various times, swept away a considerable part of this extraordinary tree; but what still remains is nearly two thousand feet in circumference, measured round the principle stems; the over-hanging branches, not yet struck down, cover a much larger space; and under it grow a number of custard apple, and other fruit trees:-The large trunks of this single tree amount to three hundred and fifty, and the smaller ones exceed three thousand: each of these is constantly sending forth branches and hanging roots, to form other trunks, and become the parents of a future progeny.

The Cuberer Burn is famed throughout Hindostan, not only on account of its great extent, but also of its surpassing beauty. The Indian armies generally encamp around it; and, at stated seasons, selemn jatarras, or Hindoo festivals, to which thousands of votaries repair from every

part of the Mogul empire, are there celebrated. It is said that 7000 people find ample room to repose under its shade. It has long been the custom of the British residents in India, on their hunting and shooting parties, to form extensive encampments, and spend weeks together, under this magnificent pavilion, which affords a shelter to all travellers, particularly to the religious tribes of the Hindoos. is generally filled with a variety of birds, snakes, and monkies, the latter of whom both divert the spectator by their antic tricks, and interest him by the parental affection they display to their young offspring, in teaching them to select their food, to exert themselves in jumping from bough to bough, and in taking, as they acquire strength, still more extensive leaps from tree to tree. In these efforts, they encourage them by caresses, when timorous, and menace, and even beat them, when refractory.

THE WEDDED BANIAN TREE.

Among the varieties of the Banian, or Burr trees, is the PEIPAL, or ficus religiosa, which is not uncommon in Guzzerat, and causes a singular variety of vegetation. It may be considered as belonging to the order of creepers, and often springs round different trees, particularly the palmyra, or palm. The latter growing through the centre of a banian tree, looks extremely grand. The peipal frequently shoots from old walls, and runs along them, so as to cause a singular phenomenon of vegetation. In the province of Bahar, one of these trees was seen by an English traveller. on the inside of a large brick well, the whole circumference of the internal space of which it lined, and thus actually became a tree turned inside out. A banian tree thus inverted is uncommon; but the general usefulness and beauty of this variety, especially in overshadowing the public wells and village markets, can only be known by those who live in a sultry climate.

THE COCOA-NUT TREE.

Or all the gifts which Providence has bestowed on the oriental world, the cocoa-nut tree is the one most deserving of notice. The blessings which are conveyed to man, by this single production of nature, are incalculable. It

grows in a stately column, from thirty to fifty feet in height. crowned by a verdant capital of waving branches, covered with long spiral leaves: under this foliage, bunches of blossoms, clusters of green fruit, and others arrived at maturity, appear in mingled beauty. The trunk, though porous, furnishes beams and rafters for the habitations: and the leaves, when platted together, make an excellent thatch, as well as common umbrellas, coarse mats for the floor, and brooms; while their finest fibres are woven into very beautiful mats for the rich. The covering of the young fruit is extremely curious, resembling a piece of thick cloth, in a conical form, as close and firm as if it came from the loom; it expands after the fruit has burst through its inclosure, and then appears of a coarser texture. The nuts contain a delicious milk, and a kernal sweet as the almond: this, when dried, affords abundance of oil; and when that is expressed, the remains feed cattle and poultry, and make a good manure. The shell of the nut furnishes cups, ladles, and other domestic utensils, while the husk which encloses it is of the utmost importance: it is manufactured into ropes, and cordage of every kind, from the smallest twine to the largest cables, which are far more durable than those of hemp. In the Nicobar islands, the natives build their vessels, make the sails and cordage, supply them with provisions and necessaries, and provide a cargo of arrack. vinegar, oil, jaggree or coarse sugar, cocoa-nuts, coir, cordage, black paint, and several inferior articles, for foreign markets, entirely from this tree.

Many of the trees are not permitted to bear froit; but the embryo bud, from which the blossoms and nuts would spring, is tied up to prevent its expansion; and a small incision being then made at the end, a cool pleasant liquor, called Tarce, or Toddy, the palm-wine of the poets, oozes out in gentle drops.

THE UPAS, OR POISON TREE.

Although a serious refutation of the gross imposition practised on the people of Europe, by the romance of Foersch on the subject of the UPAS, or celebrated poison-tree of Java, may at this time be in a great measure superfluous, as the world has long ceased to be the dupe of his story, and as regular series of experiments have been instituted,

both in England and in France, to ascertain the nature and potency of the poison; yet an authentic account of this poison, as drawn out by Dr. Horsfield, and published in the seventh volume of the Batavian transactions, cannot fail to be interesting. Almost every one has heard of its fabulous history, which, from its extravagant nature, its susceptibility of poetical ornament, its alliance with the cruelties of a despotic government, and the sparkling genius of Darwin, whose purpose it answered to adopt and personify it as a malignant spirit (in his Loves of the Plants), has obtained almost equal currency with the wonders of the Lernian hydra, or any other of the classic fictions of antiquity.

Although, the Doctor observes, the account published by Foersch, so far as relates to the situation of the poison-tree. to its effects on the surrounding country, and to the application said to have been made of the upas on criminals in different parts of the island, has, as well as the description of the poisonous substance itself, and its mode of collection. been demonstrated to be an extravagant forgery; the existence of a tree on Java, from the sap of which a poison is prepared, equal in fatality, when thrown into the circulation, to the strongest animal poisons hitherto known, is a fact which it is his object to establish and illustrate. tree which produces this poison is the anchar, and grows in the eastern extremity of the island. The work of Rhumphius contains a long account of the upas, under the denomination of arbor toxicaria. The tree does not grow on Ambonia, and his description was made from the information he obtained from Makasar. His figure was drawn from a branch of what is called the male-tree, sent to him from the same place, and establishes the identity of the poison tree of Makasar, and the other eastern Islands, with the anchar of Java. The simple sap of the arbor toxicaria. (according to Rhumphius) is harmless, and requires the addition of several substances of the affinity of ginger, to render it tive and mortal. In so far it agrees with the anchar, which, in its simple state, is supposed to be mert. and, before being employed as a poison, is subjected to a particular preparation. Besides the true poison-tree, the upas of the Eastern Islands, and the anchar of the Javans. this island produces a shrub, which, as far as observations have hitherto been made, is peculiar to the same, and by

a different mode of preparation, furnishes a poison far exceeding the upas in violence. Its name is chetik; but the genus to which it belongs has not yet been discovered or described.

The anchar is one of the largest trees in the forests of Java. The stem is cylindrical, perpendicular, and rises completely naked to the height of sixty, seventy, or eighty teet. It is covered with a whitish bark, slightly bursting in longitudinal furrows. Near the ground this bark is, in old trees, more than half an inch thick, and, upon being wounded, yields plentifully the milky juice from which the celebrated poison is prepared. A puncture or incision being made into the tree, the juice or sap appears oozing out, of a vellowish colour (somewhat frothy) from old, paler, or nearly white, from young ones; exposed to the air, its surface becomes brown. The consistence very much resembles milk; but it is more thick and viscid. This san is contained in the true bark (or cortex), which, when punctured, yields a considerable quantity, so that in a short time a cup-full may be collected from a large tree. The inner bark (or liber) is of a close fibrous texture, like that of the morus papyrifera, and, when separated from the other bark, and cleansed from the adhering particles, resembles a coarse piece of linen. It has been worked into ropes. which are very strong; and the poorer class of people employ the inner bark of the younger trees, which is more easily prepared, for the purpose of making a coarse stuff which they wear in working in the fields. But it requires much bruising, washing, and a long immersion, before it can be used; and, when it appears completely purified, persons wearing this dress, being exposed to rain, are afacted with an intolerable itching, which renders their flimsy covering insupportable. It appears from the account of the manner in which the poison is prepared, that the deleterious quality exists in the gum, a small portion of which still adhering, produces, when exposed to wet, is irritating effect; and it is singular that this property of the prepared bark is known to the Javans in all places where the : tree grows, while the preparation of a poison from its juice. which produces a mortal effect when introduced into the body by pointed weapons, is an exclusive art of the inhabiiants of the eastern extremity of the island.

WONDERS OF ART.

PYRAMIDS OF EGYPT.

[See Plates, No. 56, 57, 58.]

THE largest of these stupendous monuments, equally famous for the enormity of their size, and their remote antiquity, are those of Djiza, so called from a village of that name on the bank of the Nile, distant from them about eleven miles. The three which most attract the attention of travellers stand near one another on the west side of the river, almost opposite to Grand Cairo, and not far from the site of the ancient Memphis. When viewed from a distance peering above the horizon, they display the fine transparent hue they derive from the rarified air by which they are surrounded. M. Savary having approached to within three leagues of them, in the night time, while the full moon shone bright upon them, describes them as appearing to him, under this particular aspect, like two points of rock crowned by the clouds. On a nearer approach, their sloping and angular forms disguise their real height, and lessen it to the eye; independently of which, as whatever is regular is great or small by comparison, and as these masses of stone eclipse in magnitude every surrounding object, at the same time that they are inferior to a mountain, to which alone the imagination can successfully compare them, a degree of surprise is excited on finding the first impression produced by a distant view so much diminished in drawing near to them. On attempting, however, to measure any one of these gigantic works of art by some known and determinate scale, it resumes its immensity to the mind; since, on drawing near to the opening, the persons who stand beneath it appear so small that they can scarce be taken for men.

The base of the great pyramid of Cheops, or Cheospes, so named after a king of Egypt, is estimated by Denon at seven hundred and twenty feet, and its height at four hundred and forty-eight feet, calculating the base by the mean proportion of the length of the stones, and the height by the sum of that of each of the steps or stages. Its con-

struction required so many years, and employed such a multitude of labourers, that the expenditure for garlic and onions alone, for their consumption, is said to have amounted to one thousand and sixty talents, upwards of one fourth of a million sterling. Its interior is thus accurately described by the above traveller.

"The entrance of the first gallery is concealed by the general outer covering which invests the whole of the pyramid. It is, however, probable, that the attention of the earlier searchers was by some particular appearance directed to this spot. This gallery goes towards the centre of the edifice, in a direction sloping downward to the base: it is sixty paces in length; and at the further end are two large blocks of granite, an obstacle which caused some uncertainty in the digging. A horizontal passage has been made for some distance into the mass of stone; but this

undertaking was afterwards abandoned.

"Returning to the extremity of the first gallery, and working upward by the side of the two granite blocks, you come to the beginning of the first sloping stair-case, which proceeds in an oblique direction upward for a hundred and twenty feet. You mount the steep and narrow gallery, helping your steps by notches cut in the ground, and by resting your hands against the sides. At the top of this gallery, which is formed of a calcareous stone cemented with mortar, you find a landing place about fifteen feet square, within which, to the right of the entrance, is a perpendicular opening called the well. This appears, from its irregularity, to have been the result of a fruitless attempt at a search, and has a diameter of about two feet by eighteen inches. There were no means of descending it; but by throwing down a stone, it was ascertained that its perpendicular direction could not be very considerable. On a level with the landing is a horizontal gallery, a hundred and seventy feet in length, running directly towards the centre of the pyramid; and at the extremity of this gallery is a small room, called the Queen's chamber. is an oblong square of eighteen feet two inches, by fifteen feet eight inches; but the height is uncertain, the floor having been turned up by the avidity of the searchers. One of the side walls has also been worked into, and the rubbish left on the spot. The roof, which is formed of a fine cal-



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capears state, very nearly brainful magnification in the flow, at an angle mustly equilarized; but contains matter consuming interplyphic, that the smallest trace at a encouply in .— Whether it was intended to assent a healy to interesting that, in this a set the personal mass have been both with a size of anothering two below, and would no therefore have been been extended at other. If the ensured track as could also have of the quiet, the track has a growth in the end of the area policy, must have been mody received to choose affects policy, must have been mody received to choose affects placement channels of the pyromial.

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an opening through; so that the zeal of superstition has here been opposed to the eagerness of avarice, and the latter has prevailed. After mining through thirteen feet of solid granite, a door three feet three inches square, has been discovered, which is the entrance to the principal This is a long square, sixteen feet by thirty-two, and eighteen in height. The door is in the angle facing the gallery, corresponding to the door of the queen's chamber, below. When it is said that the tomb is a single piece of granite, half polished, and without cement, all that is remarkable in this strange monument, which exhibits such rigid simplicity in the midst of the utmost magnificence of human power, will have been described. The only broken part is an attempt at a search at one of the angles, and two small holes nearly round and breast high. Such is the interior of this immense edifice, in which the work of the hand of man appears to rival the gigantic forms of nature."

To the above account by the accurate Denon, we subjoin the following pleasing one by the celebrated Doctor Clarke. The impression made by these monuments, when viewed at a distance, can never, he observes, be obliterated

from his mind.

"By reflecting the sun's rays, they appeared as white as snow, and of such surprising magnitude, that nothing we had previously conceived in our imagination had prepared us for the spectacle we beheld. The sight instantly convinced us that no power of description, no delineation, can convey ideas adequate to the effect produced in viewing these stupendous monuments. The formality of their structure is lost in their prodigious magnitude: the mind, elevated by wonder, feels at once the force of an axiom, which, however disputed, experience confirms,—that in vastness, whatsoever be its nature, there dwells sublimity!

"Having arrived at the bottom of a sandy slope, leading up to the principal pyramid, a band of Bedouin Arabs, who had assembled to receive us upon our landing, were much amused by the eagerness excited in our whole party, to prove who should first set his foot upon the summit of this artificial mountain. As we drew near its base, the effect of its prodigious magnitude, and the amazement caused in viewing the enormous masses used in its construction, affected every one of us; but it was an impression of awe and

was realize from at phrasure. In the above viscous of real celling who had countly presented in the lord local the then to the quasalor, an arround at then harrier or eliqui-Sand Francis of the special part of the first of the first francis and the first francis let the persons morning the ideas to the men ambients could heliand them authorised. With what measurement did we an end of the same of the man property to be when on arrived at the appropriate terminate with a concert to result they to obe! Here and there appeared one Andr wilder typic the minimum mount above in, the accurate algumes, weating to day the way up to the semante. Price and their you throught no harmy coming, and thempted but If was the wind in provertal pands, sursain the momental sample of early. Mosaly mont to our party had began the second, and were jamming at the tremman in I put which they care in law. One of me nothing companions, the harms saconages the most din all just at the one direct density, has now greatly for emergences on dealthree therein tend the residing by had although, and hope a new that to dondar the primary by hired as first to some fine to oth they has absence. The real of me, more a control of an the linesames at alluding landers, with many cited for ire question, and more are a transfor of simple, general eds any two ands the sugged. The mode of we see her been to amonth described, and are, from also an endein both on either pregnant to travelle . It ike a not apport in he properly angler stout. The read remay me trans in hoall to be upon a anterno, every support which, in a case all modelle senteres, to marky larger higher and the life. It me to orner and although a retirence, to receiping, by competitions married the presence annealist and netteral married terms on considerable attendence, get the object of a coof litting In span place, interes up , the see. in destroyed, challons may be regulared; and no Acor were to alter Commissions, to decide a total latter custom of the secuthe whole the or some songt are about door one ; me may ween mileds is the process on a major within Alternature We exerced with one to a instrume in the one to title had entiqued a throughout the a tensor in the p there exild for to removed in the hands in tentes and they

were liable to be broken every instant. At length we reached the topmost tier, to the great delight and satisfaction of all the party. Here we found a platform, thirty-two feet square; consisting of nine large stones, each of which might weigh about a ton; although they are much inferior in size to some of the stones used in the construction of

this pyramid.

"The view from the summit of the pyramid amply fulfilled our expectations; nor do the accounts which have been given of it, as it appears at this season of the year (in the month of August,) exaggerate the novelty and grandeur of the sight. All the region towards Cairo and the Delta resembled a sea covered with innumerable islands. Forests of palm-tr-es were seen standing in the water; the inundation spreading over the land where they stood, so as to give them an appearance of growing in the flood. the north, as far as the eye could reach, nothing could be discerned, but a watery surface thus diversified by plantations and by villages. To the south we saw the pyramids of Saccara; and, upon the east of these, smaller monuments of the same kind, nearer to the Nile. An appearance of ruins might indeed be traced the whole way from the Pyramids of Diza to those of Saccara; as if they had been once connected, so as to constitute one vast cemetery. Beyond the pyramids of Saccara we could perceive the distant mountains of the Said; and upon an eminence near the Libyan side of the Nile appeared a monastery of considerable size. Towards the west and south-west, the eve ranged over the great Libyan Desert, extending to the utmost verge of the horizon, without a single object to interrupt the dreary horror of the landscape, except dark floating spots, caused by the shadows of passing clouds upon the sand.

"The stones of the platform upon the top, as well as most of the others used in constructing the decreasing langes from the base upwards, are of soft limestone. Those employed in the construction of the pyramids, are of the same nature as the calcareous rock on which they stand, and which was apparently cut away to form them. Herodotus says, however, that they were brought from the Ara-

bian side of the Nile.

"The French attempted to open the smallest of the three

The architecture is still plates there the dress codes of the Greeks. The charte of the pullage process, from our, we hamble to another a fact the code that have a formal the result of the code of the later. I make the result despends on the code of the later of the code of the later of the code of the later of the code of the c

The same him becausement Manne in a contribut high process arising, whichever her fined some to a part and forthe in. I be traditioned along appoint proposed by account court de golor alle dime, of ponder- and of energial Acres Countries to 1 and rellier adjuncts drawn , but with anthis men bringer! code, and out stribber down sectors, but the and valley the die some in the grantful are git and in course two larger no soon on baddiness on on wall to when to peer the mount we are him only peter appears to a commence in partitional treats he by the life oney were described with a guillery set earlings, the a new tweeter grave in transform my at the early through which halls power hit or ever, regularly to the ide begin to the appendix. He will the gover position are many dispersionally and the amount of the remple. An all or tree maniforting to the ingress and positific stat siddingt with historial de livereds the reposition of the sary fluided and thin were eight the meaning of the copies difference to bear have been dealer and forting as \$1 posters. That is now of Popular less of the most of a fine the same where the plante which sammings and lead the capable. The sain territory and altala patentings within me denotyping to recension south to a few rate of their in Money good with public to the

The runes of the ages of ready I creases, which I become that there is a sure of the company of the third that the crease is a sure of the company of the co

single temple, which requires half a mile to walk round. The remains of this temple are thus described by Denon.

"Of the hundred columns of the portico aione, the smallest are seven feet and a half in diameter, and the largest twelve. The space occupied by the circumvallation of the temple contains lakes and mountains. In short, to be enabled to form a competent idea of so much magnificence, the reader ought to faucy what is before him to be a dream, as he who views the objects themselves rubs his eyes to know whether he is awake. The avenue leading from Karnac to Luxor, a space nearly half a league in extent, contains a constant succession of sphynxes and other chimerical figures to the right and left, together with fragments of

stone walls, of small columns, and of statues."

The village of Luxor is also built on the side of the ruins of a temple, not so large as that of Karnac, but in a better state of preservation, the masses not having as yet fallen through time, and by the pressure of their own weight. The most collossal parts consist of fourteen columns of nearly eleven feet in diameter, and of two statues in granite, at the outer gate, buried up to the middle of the arms, and having in front of them the two largest and best preserved The French, when in Egypt, deemed obelisks known. their means insufficient, not to hew out, but merely to transport these two monuments, which are not more than a fragment of one of the numerous edifices of the astonishing city of Thebes. They are of rose-colour granite, are still seventy feet above the ground, and to judge by the depth to which the figures seem to be covered, about thirty feet more may be reckoned to be concealed from the eve, making in all one hundred feet for their height. Their preservation is perfect; and the hieroglyphics with which they are covered being cut deep, and in relief at the bottom, show the bold hand of a master, and a beautiful finish. The gravers which could touch such hard materials must have been of an admirable temper; and the machines to drag such enormous blocks from the quarries, to transport them thither, and to set them upright, together with the time required for the labour, surpass all conception!

In speaking of the gate of the temple, which is now become that of the village of Luxor, Denon remarks as follows. "Nothing can be more grand, and at the same time

more sample, then the small married at abjects at what present in the place as the appreciable as this were their allies. the proposition of a tends counted and two ne floor pleans put saledo, when here taken up the ir almate our the rands and tomouth the sufference of the temple, who b has , nevertoses,

the room of the agent of Three of the first one butter or a reacher world rolling coppers the pilling to trial who have now of chemines, norm middle, happings. by the inscription holls of the prostors and embours. amber the sphoots they reproduce the Contract the confiscit from no not before I have which appropriate from belowed in the mortest know are only aliche torbed from the others to the magnificence of the energinary and the invalence odunds in their otastion; the aftern agreeinand by or velociting time great buildings in the one fall he a utilities in all is inventorically pour taleaned and righter history than flux of the temph a and doubles a later perforth road the mile. The thing of the his real yeld . have been out while a ange bed digreb, and a personal, of which were bloodle his regeringer, and the figure bases popular but eleganest and consecutives at company of Seath ridgers. inken tenen notime ner mirrolared t sign be the e the preaper of persons are given to perspectively and such a buy refor, ret angelo and natural attendes. But make the or adopted. ail . On Consentiete and sent to presenting manner, each ne-Log confirm topy and needs brought to 4th by the his and was our the a band been analyses of with all the leasters goinger nature and applicity.

Cast prints at the a a reproductive is enquely a panel manch were see violend complicated, that they made to an discover lives position, or automorphism to promptle a specimental action to the want of arounds absorbed above, is not and flories or the pro pro and then - toro, much by but a put, went line - 1 to אוווני משליים לונייטי עו ביוומוש ליום בילים שיינים מוניים וויוונים יווי of arroad. They are partially reputitive, and office with my iften graphical land report firster that the first man other committee to comment with the reserve polices, and transfer we

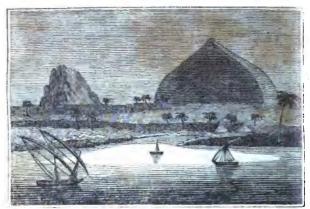
into narrow paths, leading to deep perpendicular pits. At the bottom of these pits are other adorned chambers; and lower still a new series of perpendicular pits and horizontal chambers, until at length, ascending a long flight of steps, the visitor reaches an open place on a level with the chambers he first entered.

THE ANCIENT LATOPOLIS, now called Esneh, presents, among its remains, the portico of a temple which is considered as one of the most perfect monuments of ancient architecture. It is very well preserved, and possesses a great richness of sculpture. It is composed of eighteen noble and elegant columns, with broad capitals; and the hieroglyphics in relief with which it is covered withinside and without, have been executed with great care. They contain among other subjects, a zodiac, and large figures of men with crocodiles' heads. The capitals, though all different, have a very fine effect; and, as a proof that the Egyptians did not borrow from other nations, it may be remarked, that all the ornaments of which these capitals are composed, have been taken from the productions of their own country, such as the lotus, the palm tree, the vine, the rush, &cc.

CRYPTE, OR CATACOMBS OF ALEXANDRIA.

In the construction of these primeval sepulchres a prodigious labour has been bestowed. They are situated about half a league along the shore, to the westward of the modern city of Alexandria. Their intricacy is such that the guides will not enter them without being provided with a clue of thread, to secure their retreat. Doctor Clarke has been very particular in his description of these subterraneous abodes of the dead; and from his interesting narrative the following particulars are extracted.

"The original entrance to them is now closed, and is externally concealed from observation. The only place by which admittance to the interior is practicable, is a small aperture made through the soft and sandy rock, barely large enough to admit a person upon his hands and knees. Here it is not unusual to encounter jackals, escaping from the interior, when alarmed by any person approaching: on this account the guides recommend the practice of discharging a gua, or pistol, to prevent any sally of this kind. Having passed this aperture with lighted tapers, we arrived, by gradual



No. 59 .- Remarkable form of one of the Pyramids of Saccara.



No. 60 .- Stonehenge.



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CRYPTE, OR CATACOMBS OF ALEXANDRIA. 647 descent, in a square chamber, almost filled with earth: to the right and left of this are smaller apartments, chiselled in the rock; each of these contains on either side of it, except that of the entrance, a Soros for the reception of a mummy; but, owing to the accumulation of sand in all of them, this part of the Catacombs cannot be examined without great difficulty. Leaving the first chamber, we found a second of still larger dimensions, having four Cryptæ with Soroi, two on either side, and a fifth at its extremity towards the south-east. From hence, penetrating towards the west, we passed through another forced aperture, which conducted us into a square chamber, without any receptacles for dead bodies; thence, pursuing a south-western course, we persevered in effecting a passage, over heaps of sand, from one chamber to another, admiring every where the same extraordinary effects of labour and ingenuity, until we found ourselves bewildered with so many passages, that our clue of thread became of more importance than we at first believed it would prove to be. At last we reached the stately antichamber of the principal sepulchre, which had every appearance of being intended for a regal repository. It was of a circular form, surmounted by a beautiful dome, hewn out of the rock, with exquisite perfection, and the purest simplicity of workmanship. In a few of the chambers we observed pilasters, resembling, in their style of architecture, the Doric, with architraves, as in some of the most ancient sepulchres near Jerusalem; but they were all integral parts of the solid rock. The dome covering the circular chamber was without ornament; the entrance to it being from the north-west. Opposite to this entrance was a handsome square Crypt with three Soroi; and to the right and left were other Cryptæ, similarly surrounded with places for the dead. Hereabouts we observed the remarkable symbol, sculptured in relief, of an orb with extending wings, evidently intended to represent the subterraneous Sun, or Sol Inferus, as mentioned by Macrobius. We endeavoured to penetrate farther towards the southwest and south, and found that another complete wing of the vast fabric extended in those directions, but the labour of the research was excessive.

"The cryptæ upon the south-west side corresponded with those which we have described towards the north-east. In the middle, between the two, a long range of chambers extended from the central and circular shrine towards the north-west; and in this direction appears to have been the principal and original entrance. Proceeding towards it we came to a large room in the middle of the fabric, between the supposed Serapeum and the main outlet, or portal, towards the sea. Here the workmanship was very elaborate: and to the right and left were chambers, with recentacles ranged parallel to each other. Farther on, in the same direction, is a passage with galleries and spacious apartments on either side; probably the chambers for embalming the dead, or those belonging to the priests, who constantly officiated in the Serapeum. In the front is a kind of vestibulum, or porch: but it is exceedingly difficult to ascertain precisely the nature of the excavation towards the main entrance, from the manner in which it is now choked with earth and rubbish. If this part were laid open, it is possible that something further would be known as to the design of the undertaking; and, at all events, one of the most curious of the antiquities of Egypt would then be exposed to the investigation it merits. Having passed about six hours in exploring, to the best of our ability, these gloomy mansions, we regained, by means of our clue, the aperture by which we had entered, and quitted them for ever."

RUINS OF PALMYRA.

This noble city of ancient Syria, also called Tadmor, is of uncertain date and origin, but is thought by many to have been the tadmor in the wilderness, built by Solomon. Its splendid ruins consist of temples, palaces, and porticoes of Grecian architecture, scattered over an extent of several miles. The most remarkable of them is the Temple of the Sun, the ruins of which are spread over a square of 220 yards. It was encompassed with a stately wall, built of large square stones, and adorned with pilasters within and without, to the number of 62 on each side. Within the court are the remains of two rows of very noble marble pillars 37 feet high, with their capitals of most exquisite workmanship. Of these 58 only remain entire; but there must have been many more, for they appear to have surrounded the whole

court, and to have supported a double piazza. The walks on the side of the piazza opposite to the front of the castle seem to have been the most spacious and beautiful. At the end of this line are two niches for statues, with their pedestals, borders, supporters, and canopies, carved with the utmost elegance. The space within the inclosure appears to have been an open court, in the centre of which stood the temple, encompassed with another row of pillars of a different order, and much taller, being 50 feet in height; of these 16 only remain. The whole space contained within these pillars is 59 yards in length, and nearly 28 in breadth. The temple which points north and south, is 33 yards in length, and 18 or 14 in breadth. At its centre, on the west side, is a most magnificent entry, on the remains of which vines and clusters of grapes are carved in the most bold and masterly imitation of nature that can be conceived. Over the door was displayed a pair of wings extending its whole breadth; but the body to which they belonged is totally destroyed, so that it cannot certainly be known, whether it was that of an eagle or of a cherub, several representations of both being visible on other fragments of the building. Its north extremity is adorned with the most curious fret-work and bass-relief; and in the centre is a dome . or cupola, about 10 feet in diameter, which appears to have been either hewn out of the rock, or moulded of some composition which by time has become equally hard. North of this place is an obelisk, consisting of seven large stones, besides its capital, and the wreathed work about it. It probably, supported a statue, which the Turks, in their zeal against idolatry, have destroyed. At the distance of a quarter of a mile from this pillar, to the east and west, are two others, besides the fragment of a third, so as to lead to the supposition that there was originally a continued row.

About 100 paces from the middle obelisk, straight forward, is a magnificent entry to a piazza, 40 feet in breadth and more than half a mile in length, inclosed with two rows of marble pillars 26 feet high, and 8 or 9 feet in compass. Of these there still remain 129; and by a moderate computation, there could not have been originally less than 560. The upper end of this piazza was shut in by a row of pillars, standing somewhat closer than those on each side. A little to the left are the ruins of a stately building, which

appears to have been a banqueting house : it is built of better marble, and is finished with still greater elegance than the piazza. The pillars by which it was supported were of one entire stone, so strong that one of them which has fallen down has not received the slightest injury. It measures 23 feet in length; and in compass 8 feet 9 inches. west side of the piazza are several apertures for gates into the court of the palace, each of them ornamented with four porphyry pillars, not standing in a line with those of the wall, but placed by couples in the front of the gate facing the palace, two on each side. Two of these only remain entire, and one only standing in its place. They are 30 feet in length, and nine in circumference. On the east side of the piazza stand a great number of marble pillars, some perfect, but the greater part mutilated. In one place 11 of them are ranged in a square, the space they inclose being paved with broad flat stones, but without any remains of a roof. At a little distance are the remains of a small temple, also without a roof, and having its walls much defaced. Before the entry, which faces the south, is a piazza supported by six pillars, two on each side of the door, and one at each end. The pedestals of those in front have been filled with inscriptions, both in Greek and Palmyrene languages, which are become totally illegible. Among these ruins are many sepulchres, ranged on each side of a hollow way towards the north part of the city, and extending more than a mile. They are square towers, four or five stories high, alike in form, but differing in magnitude and splen-The outside is of common stone; but the floors and partitions of each story are of marble. A walk crosses the centre of this range of buildings, and the space on each side is subdivided by thick walls, into six partitions, the space between which is wide enough to receive the largest corpse. In these piches six or seven are piled on one another.

RUINS OF BALBEC. 1877

THESE magnificent ruins are described by Mr. Bruce as even surpassing what he had seen at Palmyra. He was particularly struck by the splendid vestiges of the great temple, supposed to have been dedicated to the sun. The Castle of Balbee, or Tower of Lebanon, is described by Father Leander, of the order of bare-footed Carmelites, in his inter-

esting travels, as a surprising monument of antiquity, built, according to the tradition of the natives, by Solomon.—

His relation is as follows.

"Balbec is distant from Damascus, towards the north, about fifty miles, and on the southern side is watered by springs and rivulets, brought thither, no doubt, to fill the ditches by which it was to have been surrounded for defence. but which were not completed. It is situated on the loftv summit of a hill, in approaching which the façade of the castle is seen, having two towers at its right angles, between which is a great portico, resembling the mouth of a vast cave, and provided with very strong walls. That on the right hand, by which the portico is attached to the tower, from the west to the north, is composed of four stones only, the fifth, which was to have completed the fabric, being deficient. The length of each of these stones is not less than sixty two feet, and their breadth and height thirteen. They are so artfully brought together, without any cement, that they appear to be only one solid block. The remainder of the wall to the left is of hewn stones, well cemented with quick lime, the smallest of which are 6 feet in length, and 4 feet six inches in height: there are many which are upwards of fifteen feet in length, but the height all of them is the same.

"Having entered the cavern by the grand portico, the

traveller proceeds in obscurity to the distance of eighteen paces, when he at length perceives a ray of light proceeding from the aperture of the door which conducts to the centre. At each of the sides, and within this grand portico, is a flight of stone steps which leads to the subterraneous prisons. Their aspect is horrid, and they are dangerous, inasmuch as they are wont to be frequented by banditties of robbers, who here plunder, kill, and bury such wretched travellers as are imprudently led by their curiosity to penetrate, and risk the descent without being well escorted. Following the road above, by the cavern, to the extent of fifty paces, an ample area of a spherical figure presents itself, surrounded by majestic columns of granite, some of them of a single piece, and others formed of two pieces, the whole of them of so large a dimension, that two men can with difficulty girt them. They are of the Ionic order of architecture, and are placed on bases of the same stone, at such distances from

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each other that a coach and six might commodicusly turn between them. They support a flat tower or roof, which projects a cornice wrought with figures of matchless workmanship: these rise above the capitals with so nice an union, that the eye however perfect it may be, cannot distinguish the part in which they are joined. At the present time the greater part of this colonnade is destroyed, the western part alone remaining perfect and upright. This fabric has an elevation of 500 feet, and is 400 feet in length. In its exterior, and behind, it is flanked by two other towers similar to those of the first façade, the whole projecting from the wall, which withinside is provided with loop holes, to keep off the enemy, in case of necessity, by the means of stones, fire, &c. It also surrounds the colonnade, more particularly in the part which looks towards the east. At the left flank rises a temple, which tradition says was the hall of audience of Solomon, in height at least 80 feet, and long and large in proportion. Its stones are all sculptured with bass-reliefs, similar to those which ornament Trajan's column at Rome, representing many triumphs and naval engagements. Several of these bass-reliefs have been defaced by the aracens, who are the decided enemies of all sculptures. Withoutside this grand hall is an avenue of the same size and breadth, where the traveller admires a large portal constructed with three stones only, attached to which, in the middle part, serving as an architrave, is seen, in a garland of laurel interwoven with flowers, a large eagle admirably sculptured in bass-relief. At the sides of the portal are placed two columns, in one of which, although termed of a single stone, is a winding staircase by which to ascend to the architrave: the passage is however very narrow. There is in the vicinity another temple, of an octangular shape, with a portico of superb architecture, and having three windows on the side opposite to the former."

On a large stone are inscribed these words in Latin: Diviso Mosei, on which Father Leander confesses he knows not what interpretation to bestow. Thrice he returned to visit this splendid vestige of antiquity; and on the last of these occasions, being well escorted, he proceeded to the distance of about a mile, to the foot of the mountains of Damascus, whence the stones employed in its construction were brought. He measured the stone which remained

there, and which has been already noticed as having been intended for the fifth in the construction of the wall: it had been hewn out on all sides, was lying on the ground, and was simply attached to the rock at the inferior part. Its length and dimensions were such, that he could not conceive how it would have been possible to detach it, and still less with what machines to move, transport, and raise it to the height at which the other stones are placed, more especially as the sites, the roads, and the masses of rock are such, as to exceed in asperity whatever the imagination can picture to itself. In the vicinity of the cave whence these stones were drawn, is a very beautiful sepulche supported by columns of porphyry, over which is a dome of the fluest symmetry.

RUINS OF BABYLON.

[See Plates, No. 63, 64, 65.]

THESE ruins are to be regarded as the most interesting productions of man, as well on account of their paramount antiquity, as of all the associations connected with them. They have been visited and described by Mr. Rich, resident for the East India company at Bagdad; and the result of his researches is given by the Rev. Mr. Maurice, Author of Indian Antiquities, and Assistant Librarian to the British Museum, in his elaborate work entitled "Observations connected with Astronomy and Ancient History, sacred and profane, on the Ruins of Babylon."

Babylon was situated in a plain of vast extent, and bisected by the noble river Euphrates. Over this river was thrown a bridge of massy masonry, strongly compacted with iron and lead, by which the two sides of the city were connected; and the embankments on each side, to restrain its current, were lofty, and formed of the same durable materials as the walls of the city. The city itself is represented by Herodotus to have been a perfect square, enclosed by a wall in circumference four hundred and eighty furlongs. It is stated to have abounded in houses three or four stories in height, and to have been regularly divided into streets, running parallel to each other, with tranverse avenues occasionally opening to the river. It was surrounded with a wide and deep trench, the earth dug out of which was formed into square backs and baked in a furnace. With

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these, cemented together with heated bitumen, intermixed with reeds to bind the viscid mass, the sides of the trenches were lined; and of the same solid materials the walls of the vast dimensions above described were formed. At certain regular distances on them, watch towers were erected; and below they were divided and adorned with a hun-

dred massy gates of brass.

In the centre of each of the grand divisions of the city, a stupendous public fabric was erected. In one (the eastern side) stood the temple of Belus; and in the other, (or western division) in a large or strongly fortified inclosure, the royal palace, intended, doubtless, for defence as well as for ornament. The temple of Belus was a square pile, on each side of the extent of two furlongs. The tower erected in its centre was a furlong in breadth, and as much in height, the latter of which (taking the furlong at only 500 feet) is enormous, being higher, by 20 feet, than the great pyramid of Memphis, whose altitude was taken by Greaves. On this tower, as a BASE, seven other lofty towers were erected in regular succession; and the whole was crowned, according to Diodorus, with a brazen statue of the good Belvs, 40 feet high! The palace, intended also as a citadel, was crected on an area a mile and a half square, and was surrounded with three vast circular walls, which, as we are informed by Diodorus Siculus, were ornamented with sculptured animals resembling life, richly painted in their natural colours on the bricks of which they were com-posed, and afterwards burnt in. This may be mentioned as nearly the earliest specimen of enamelling on record. Indeed, it was scarcely possible for a nation, who were so well practised in the burning of bricks even to a vitreous hardness, to have been ignorant of this fine art, and that they could also engrave upon them, is evident (were: such evidence wanting) from the characters at this dai sculptured upon those that have been dug up and brought to Europe, two of which are preserved in the British Museum. On the far-famed hanging gardens, and the subterraneous vault or tunnel constructed by Semiramis, or Nitocris, or the founder of Babylon, whoever he was, there is no necessity to dilate, as every trace of them, except what the idle foncy of travellers has surmised, must long since have disappeared; but such, in its general out-Was THE MIGHTY BABYLON. Digitized by GOOGLE

RUINS OF BABYLON. 1677,555

Mr. Rich, whose residence at the court of Bagdad, and the powerful protection of the Pacha, afforded him every facility for comprehensive investigation, describes the whole country between Bagdad and Hella, a distance of 48 miles, as a perfectly flat, and, for the greater part, uncultivated waste; though it is evident, from the number of canals by which it is traversed, and the immense ruins that cover its surface, that it must formerly bave been both well peopled and cultivated. About two miles above Hella, the more prominent ruins commence, among which, at intervals, are discovered, in considerable quantities, burnt and unburnt bricks and bitumen; two vast mounds in particular attract attention from their size, and these are situated on the east-There are scarcely any reerhabank of the Euphrates. mains of ruins visible, immediately opposite on the western bank, but there are some of a stupendous magnitude on that

side, about six miles to the south-west of Hella.

The first grand mass of ruins described by Mr. Rich, extends one thousand one hundred yards in length, and eight hundred in its greatest breadth, its figure nearly resembling that of a quadrant; its height is irregular; but the most elevated part may be about fifty or sixty feet above the level of the plain, and it has been dug into for the purpose of procuring bricks. On the north is a valley of 550 yards in length, the area of which is covered with tussocks of rank grass, and crossed by a line of rains of very little elevation. To this succeeds the second grand heap of ruins, the shape of which is nearly a square, of seven hundred yards length and breadth, and having its S. W. angle connected with the N. W. angle of the mounds of Amran, by a ridge of considerable height, and nearly 100 yards in breedth. This is certainly the most interesting part of the ruins of Babylon; every vestige discoverable in it declares it to have been composed of buildings far superior to all the rest which Have left traces in the eastern quarter, the bricks are of the finest description; and, notwithstanding this is the grand storehouse of them, and that the greatest supplies have been and are now constantly drawn from it, they appear still to be abundant. But the operation of extracting the bricks has caused great confusion, and contributed much to increase the difficulty of decyphering the original design of this mound, as, in search of them, the workmen pierce into it in every direction, hollowing out deep ravines and pits, and throwing up the rubbish in heaps on the surface. In some places they have bored into the solid mass, forming winding caverns and subterraneous passages, which from their being left without adequate support, frequently bury the workmen in the rubbish. In all these excavations, walls of burnt brick, laid in lime mortar of a very good quality are seen; and, in addition to the substances generally strewed on the surfaces of all these mounds, we here find fragments of alabaster vessels, fine earthenware, marble, and great quantities of varnished tiles, the glazing and colouring of which are surprisingly fresh. In a hollow near the southern part Mr. Rich found a sepulchral urn of earthenware, which had been broken in digging, and near it lay some

human bones, which pulverized with the touch.

Not more than two hundred yards from the northern extremity of the above mound is a ravine hollowed out by those who dig for bricks, in length nearly a hundred yards, and thirty feet wide, by forty or fifty deep. On one side of it a few yards of wall remain standing, the face of which is very clean and perfect, and which appears to have been the front of some building. The opposite side is so confused a mass of rubbish, that it should seem the ravine had been worked through a solid building. Under the foundations at the southern end an opening is made, which discovers a subterraneous passage seven feet in height, and winding to the south, floored and walled with large brick, laid in bitumen. and covered over with pieces of sand-stone, a yard thick, and several yards long, on which the whole pressure is so great as to have given a considerable degree of obliquity to the side walls of the passage. The superstructure is cemented with bitumen, other parts of the ravine with mortar. and the bricks have all writing on them. The northern end of the ravine appears to have been crossed by an extremely thick wall of yellowish brick, cemented with a brillian white mortar, which is been broken through in hollowing it out : and a little to the north is sculptured alion of colossal dimensions, standing on a pedestal, of a coarse kind of grey gravite, and of rude workmanship; in the mouth is a circular aperture, into which a man may introduce his fist.

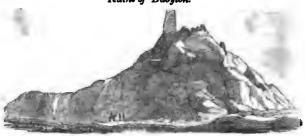
The next considerable mass to that of Amran is the Kasr, or Palace, as it is called by the natives, and it is thus

described by Mr. Rich.

"It is a very remarkable ruin, which, being uncovered, and in part detached from the rubbish, is visible from a considerable distance, but so surprisingly fresh in its appearance, that it was only after a minute inspection I was satisfied of its being in reality a Babylonian remain. It consists of several walls and piers, (which face the cardinal points,) eight feet in thickness, in some places ornamented with niches, and in others, strengthened by pilasters and buttresses, built of fine burnt brick, (still perfectly clean and sharp,) laid in lime cement, of such tenacity, that those whose business it is have given up working, on account of the extreme difficulty of extracting them whole. The tops of these walls are broken, and may have been much higher. On the outside, they have in some places been cleared nearly to the foundations; but the internal spaces, formed by them, are yet filled with rubbish, in some parts almost to their summit. One part of the wall has been split into three parts, and overthrown, as if by an earthquake; some detached walls of the same kind, standing at different distances, show what remains to have been only a small part of the original fabric; indeed, it appears that the passage in the ravinc, together with the wall which crosses its upper end, were connected with it. There are some hollows underneath, in which several persons have lost their lives; so that no one will now venture into them, and their entrances have become choked up with rubbish. Near this ruin is a heap of rubbish, the sides of which are curiously streaked by the alternation of its materials, the chief part of which, it is probable, was unburnt brick, of which I found a small quantity in the neighbourhood; but no reeds were discoverable in the interstices.

"A mile to the north of the Kasr, or full five miles distant from Hella, and 950 yards from the river bank, is the last ruin of this series, which has been described by Pietro Della Valle, who determines it to have been the Tower of Belus, an opinion adopted by Rennel. The natives call it Mukallibe, or, according to the vulgar Arab pronunciation of these parts, Mujelibe, meaning overturned; they sometimes also apply this term to the mounds of the Kasr. It is of an oblong shape, irregular in its height and the measurement of its sides, which face the cardinal points; the northern side being 200 yards in length, the southern 219,

Ruins of Babylon.



No. 63 .- The Birs Nimroud.



No. 64 .- The Kasr.



No. 65 .- The Mujelibe. .

prising mass of all the remains of Babylon is situated in the desert about six miles to the south-west of Hella. ed by the Arabs Birs Nimrod, by the Jews, Nebuchadnez. zar's Prison. It is a mound of an oblong figure, the total circumference of which is seven hundred and sixty-two yards. At the eastern side it is cloven by a deep furrow, and is not more than fifty or sixty feet high; but at the western it rises in a conical figure to the elevation of one hundred and ninety-eight feet; and on its summit is a solid pile of brick, thirty-seven feet high by twenty-eight in breadth, diminishing in thickness to the top, which is broken and irregular, and rent by a large fissure extending through a third of its height. It is perforated by small square holes, disposed in rhomboids. The fine burnt bricks of which it is built have inscriptions on them; and so admirable is the cement, which appears to be lime-mortar, that, though the layers are so close together that it is difficult to discern what substance is between them, it is nearly impossible to extract one of the bricks whole. The other parts of the summit of this hill are occupied by immense fragments of brick-work, of no determinate figure, tumbled together and converted into solid vitrified masses, as if they had undergone the action of the fiercest fire, or been blown up with gunpowder, the layers of the bricks being perfectly discernible,-a curious fact, and one for which I am utterly incanable of accounting.

"Round the Birs are traces of ruins to a considerable extent. To the north is the canal which supplies Mesjiid Ali with water, which was dug at the expence of the Nuwaub Shujahed Doulah, and called after his country, Hindia. We are informed that, from the summit of the Birs, in a clear morning, the gilt dome of Mesjiid Ali may

be seen."

BABYLONIAN BRICKS.

The most ancient method of writing was on stone or brick, of which, as the earliest example on record, if allowable to be cited, may be adduced that of the two pillars of Seth, the one of brick and the other of stone, said by Josephus to have been erected before the deluge, and to have contained the history of antediluvian arts and sciences.—However disputable this account may be, that of the table

of atone on which the decalogue was written by the finger of the Deity, and delivered to Moses on Mount Sinai, can admit of no doubt, no more than can the hieroglyphic characters in the most ancient periods, engraved on the marbles of Egypt, at present so abundant in the collections of Europe. They remain to this day, and will be, for centuries to come, a lasting proof of the high advance in the engraving art, as well as in chemical science, of a nation, who, at that early period, could fabricate instruments to cut them so deep and indelibly on the almost impenetrable granite.

In countries destitute of stone, like Chaldæa, an artificial substance, clay, intermixed with reeds, and indurated by fire, was made use of for that purpose. Of this substance, formed into square masses, covered with mystic characters, the walls and palaces of Babylon were, for the most part, constructed: and it has been seen in the accounts of travellers who have visited these ruins, examined the bricks, and observed those reeds intermingled with their substance, how durable, through a vast succession of ages, those bricks, with their inscribed characters, have remained.—Their real meaning, or that of the Persepolitan arrow-headed obelistical characters, and the still more complicated hieroglyphics of Egypt, however partially decyphered by the labours of the learned, will, perhaps, never be fathomed in their full extent, by the utmost ingenuity of man

Of the bitumen with which these Babylonian bricks were cemented together, and which was plentifully produced in the neighbourhood of Babylon, it may be proper in this place to remark, that it binds stronger than mortar, and in time becomes harder than the brick itself. It was also impenetrable to water, as to the early descendants of Noah was well known, for both the outside and the inside of the ark was incrusted with it. Gen. vi. 14. It may be proper to add here, that the bitumen, to deprive it of its brittleness, and render it capable of being applied to the brick, must be boiled with a certain proportion of oil, and that it retains its tenacity longest in a humid situation. Mr. Rich informs us, that it is, 'at present, principally used for caulking boats, coating cisterns, baths, and other places which usually come in contact with water. The fragments of it scattered over the ruins of Babylon are black, shining, and brittle, somewhat resembling pit-coal in substance and appearance.

It will not be forgotten, that the custom, above alluded to of mixing straw or reeds with bricks baked in the sun, in order to bind them closer, and to make them more firm and compact, was also used in Egypt, as may be inferred from Exodus v. 7, where Pharaoh commands the task-masters of the oppressed Israelites not to give them straw to make bricks, in order to multiply their vexations, and increase their toil.

Speaking of the Babylonian bricks, and their variety, in respect to size, colour, and hardness, Mr. Rich informs us, that "the general size of the kiln-burnt brick is thirteen inches square, by three thick: there are some of half these dimensions, and a few of different shapes for particular purposes, such as rounding corners, &c. They are of several different colours; white, approaching more or less to a yellowish casti the our Stourbridge, or fire-brick, which is the finest sort; rea, like our ordinary brick, which is the coarsest sort; and some which have a blackish cast, and are very hard. The sun-dried brick is considerably larger than that baked in the kiln, and in general looks like a thick clumsy clod of earth, in which are seen small broken jeeds, or chopped straw, used for the obvious purpose of pinding them: in like manner the flat roofs of the houses of Bagdad are covered with a composition of earth and mortar, mixed up with chopped straw." At the Birs Nemroud, Mr. Rich found some fire-burnt bricks, which appeared to have had the same materials in their composition. The best sun-dried bricks he met with are those which compose the ruin called Akerkout. In the kasr, or palace, our author found, in general, finer specimens of art; for, in addition to the substances generally strewed on the surfaces of all these mounds, he saw fragments of alabaster vessels, fine earthern-ware, marble, and great quantities of varnished tiles, the glazing und colouring of which are surprisingly fresh. The process from making pottery to moulding figures in clay, was not difficult; but the designs in brass, and the grouping of the figures, must have required much greater skill and labour.

RUINS OF PERSEPOLIS.

The most striking feature, on a first approach to these splendid ruins, is the stair-case and its surrounding walls.

Two grand flights, which face each other, lead to the principal platform. To their right is an immense wall of the finest masonry, and of the most massive stones; to the left, are other walls, equally well built, but not so imposing. On arriving at the summit of the stair-case, the first objects which present themselves directly facing the platform, are four vast portals and two columns. Two portals first, then the columns, and then two portals again. On the front of each are represented, in basso-relievo, figures of animals, which, for want of a better name, may be called sphinxes. The two sphinxes on the first portals face outwardly, i. e. towards the plain and the front of the building. The two others, on the second portals, face inwardly, i. e. towards the mountain. From the first, (to the right, on a straight line,) at the distance of fifty-four paces, is a stair-case of thirty steps, the sides of which are ornamented with bassreliefs, originally in three rows, but now partly reduced by the accumulation of earth beneath, and by mutilations. above. This stair-case leads to the principal compartment of the whole ruins, which may be called a small plain, thick ly studded with columns, sixteen of which are now erect. Having crossed this plain, on an eminence are numerour stupendous remains of frames, both of windows and doors? formed by blocks of marble of sizes most magnificent. These frames are ranged in a square, and indicate an apartment the most royal that can be conceived. On each side of the frames are sculptured figures, and the marble still retains a polish which, in its original state, must have vied with the finest mirrors. On each corner of this room are pedestals, of an elevation much more considerable than the surrounding frames; one is formed of a single block of The front of this apartment seems to have been to the south-west, for few marks of masonry are to be seen on that exposure, and the base of that side is richly sculp-This front opens upon a square tured and ornamented. platform, on which no building appears to have been raised. But on the side opposite to the room just mentioned, there is the same appearance of a corresponding apartment, although nothing but the bases of some small columns, and the square of its floor, attest it to have been such. The interval between these two rooms, (on those angles which are the furtherest distant from the grand front of the building,

is filled up by the base of a sculpture, similar to the bases of the two rooms, excepting that the centre of it is occupied by a small flight of steps. Behind, and contigious to these ruins, are the remains of another square room, surrounded on all sides by frames of doors and windows. On the floor are the bases of columns: from the order in which they appear to have stood, they formed six rows, each of six columns. A staircase, cut into an immense mass of rock, leads into the lesser and enclosed plain below. Towards the plain are also three smaller rooms, or rather one room and the bases of two closets. Every thing on this part of the building indicates rooms of rest or retirement.

In the rear of the whole of these remains, are the beds of aqueducts, which are cut into the solid rock. They occur in every part of the building, and are probably, therefore, as extensive in their course, as they are magnificent in their construction. The great aqueduct is to be discovered among a confused heap of stones, not far behind the buildings described above, on that quarter of the palace, and almost adjoining to a ruined stair-case. Its bed in some places is cut ten feet into the rock. This bed leads east and west; to the eastward its descent is rapid, about twenty-five paces; it there narrows; but again enlarges, so that a man of common height may stand upright in it. It

terminates by an abrupt rock.

Proceeding from this towards the mountains, situated in the rear of the great hall of columns, stand the remains of a magnificent room. Here are still left walls, frames, and porticoes, the sides of which are thickly ornamented with bass-reliefs of a variety of compositions. This hall is a perfect square. 'To'the right of this, and further to the southward, are more fragments, the walls and component parts apparently of another room. To the left of this, and therefore to the northward of the building, are the remains of a portal, on which are to be traced the features of a sphynx. Still towards the north, in a separate collection, is the ruin of a column, which, from the fragments about it, must have supported a sphynx. In a recess of the mountain, to the northward, is a portico. Almost in a line with the centre of the hall of columns, on the surface of the mountain, is a tomb. To the southward of that is another, in like manner on the mountain's surface; between both, and just on that point where the ascent from the plain commences, is a reservoir of water.

These, observes Mr. Morier, in the account of his Lmbassy to Persia, constitute the sum of the principal objects among the ruins of Persepolis.

ROYAL PALACE OF ISPAHAN

THE palaces of the King are inclosed in a fort of lofty walls, which is estimated to have a circumference of three The palace of the Chehel Sitoon, or 'forty pillars,' is situated in the middle of an immense square, which is intersected by various canals, and planted in different directions by the beautiful chenar tree. In front is an extensive square basin of water, from the fartherest extremity of which the palace is beautiful beyond either the power of language or the correctness of pencil to delineate. The first saloon is open towards the garden, and is supported by eighteen pillars, all inlaid with mirrors, and, the glass being in a much greater proportion than the wood, appears at a distance to be formed of glass only. Each pillar has a marble base, which is carved into the figures of four lions placed in such attitudes, that the shaft seems to rest on their four united The walls, which form its termination behind, are also covered with mirrors placed in such a variety of symmetrical positions, that the mass of the structure appears to be of glass, and when new must have glittered with most magnificent splendour. The ceiling is painted in gold flowers, which are still fresh and brilliant. curtains are suspended on the outside, which are occasionally lowered to lessen the heat of the sun.

THE TEMPLE OF MECCA.

This magnificent temple, to which pilgrims resort from every quarter of the globe where the religion of Islamism is practised, is known by the Mussulmen under the name of EL HARAM, or the temple of excellence. It is situated nearly in the middle of the city, which is built in a valley, having a considerable slope from the north to the south. It is composed of the house of God, Beit Allah, or as it is called also, La Kaaba; of the Well of Zemzem, Bir Zemzem; of the Cobba, or place of Abraham, Makham, Ibrahim; of the places of the four orthodox rites, Makam

Ilhaneffi, Makam Shaffi, Makam Maleki, and Makam Hhanbeli; of two Cobbas, or Chapels, El Cobbatain; of an arch, called Babes-selem (in the same style as a triumphal arch), near the place of Abraham; of El Monbar or the Tribune for the Priest; of the wooden staircase, Daureh, which leads to the saloon of the house of God; of an immense court, surrounded by a triple row of arches: of two smaller courts, surrounded with elegant piazzas; of nineteen doors; and of seven towers, or minarets, five of which adhere to the edifice, and the other two are placed between the neighbouring houses out of the inclosure.

La Kaaba, Beit Allah, or the house of God, is a quadrilateral tower, the sides and angles of which are unequal, so that its plan forms a true trapezium. The size of the edifice, and the black cloth which covers it, make this irregularity disappear, and give to it the figure of a perfect square.

The black stone, Hhajera el Assouad, or heavenly stone, which all true Mussulmen believe to have been brought thither by the angel Gabriel, is raised forty-two inches above the surface, and is bordered all round with a large plate of silver, about a foot broad. The part of the stone that is not covered by the silver at the angle is almost a semi-circle, six inches in height, by eight inches six lines diameter at its base.

El Bir Zemzem, or the well of Zemzem, is situated fiftyone feet distant to the E. 10° N. of the black stone. It is
about seven feet eight inches in diameter, and fifty six feet
deep to the surface of the water. The brim is of fine white
marble, five feet high. Tradition records that this well
was miraculously opened by the angel of the Lord for
Agar, when she was nearly perishing from thirst in the
desert with her son Ismael, after having been sent from
Abraham's house.

The Kaaba, and the stones of Ismael, are situated nearly in the centre of the temple, and occupy the middle of an oval or irregular elliptical surface, which forms a zone of thirty-nine feet wide round the edifice, upon which the pilgrims make their tours round the Kaaba. It is paved with time marble, and is situated upon the lowest plane of the temple.

HOLY LAND.

BETHLEHEM.

[See Plate, No. 66.]

BETHLEHEM is situated at the distance of six miles from JERUSALEM, in a fine country, blest with a salubrious air. and abundant fertility. The water is conveyed in a low aqueduct which formerly passed to Jerusalem. SIGNATUS is a charming spring, yielding a constant supply of water to three large cisterns, one of which is still in good preservation. At a small distance from these, a beautiful rivulet called the DELICLE SOLOMONIS laves the herbage of the valley, and fertilizes several fine gardens, while the circumjacent soil is richly clothed with an elegant assemblage of fig-trees, vines and olives.

Bethlehem received its name, which signifies the House of Bread, from Abraham; and it was surnamed Ephrata. the Fruitful, after Caleb's wife, to distinguish it from another Bethlehem, in the tribe of Zebulon. It belonged to the tribe of Judah, and also went by the name of the City of David, that monarch having there been born, and tended sheep in his childhood. Abijan, the seventh judge of Israel, Elimelech, Obed, Jesse, and Boaz, were, like David, natives of Bethlehem, and here must be placed the scene of the admirable eclogue of Ruth. St. Matthias the apostle, also received life in the village of Bethlekem.

The convent is connected with the church by a court inclosed with lofty walls. This court leads by a small sidedoor into the church. The edifice is certainly of high antiquity, and, though often destroyed and as often repaired, it still retains marks of its Grecian origin. On the pavement at the foot of the altar you observe a marble star. which corresponds, as tradition asserts, with the point of the heavens where the miraculous star that conducted the three kings became stationary. The Greeks occupy the choir of the Magi, as well as the two other naves formed by the transform of the cross. These last are empty, and without altars. Two spiral staircases, each composed of fifteen steps, open on the sides of the outer church, and conduct to the subterraneous church situated beneath this choir. farther extremity of the crypt, on the east side, is the spot





where tradition reports the Virgin to have brought forth the Redeemer of Mankind. This spot is marked by a white marble, incrusted with jaspar, and surrounded by a circle of silver, having rays resembling those with which the sun is represented. Around it are inscribed these words:

HIC DE VIRGINE MARIA JESUS CHRISTUS NATUS EST.

. At the distance of seven paces towards the south, after you have passed the foot of one of the staircases leading to the upper church, you find the Manger. You go down to it by two steps, for it is not upon a level with the rest of the crypt. It is a low recess, hewn out of the rock. A block of white marble, raised about a foot above the floor, and hollowed in the form of a manger, indicates the spot where our Saviour was laid upon straw.

Two paces farther, opposite to the manger, stands an altar, which occupies the place where Mary sat when she presented the Child of Sorrow to the adoration of the Magi.

Nothing can be more pleasing, or better calculated to excite sentiments of devotion, than this subterraneous church. It is adorned with pictures of the Italian and Spanish schools. These pictures represent the mysteries of the place, the Virgin and Child, after B iphael, the Annunciation, the Adoration of the Wise Men, the Coming of the Shepherds, and all those miracles of mingled grandeur and innocence. The usual ornaments of the manger are of blue satin embroidered with silver. Incense is continually smoking before the cradle of the Saviour.

The Grotto of the Nativity leads to the subterraneous chapel, where tradition places the sepulchre of the Innocents: "Herod sent forth and slew all the children that were in Bethlehem, and in all the coasts thereof, from two years old and under. Then was fulfilled that which was spoken by Jeremiah the prophet, saying: In Rama was there a voice heard," &c.

NAZARETH.

[See Plates, No. 67, 68.]

THE village of Nazareth is situated in a long valley, surrounded by lofty hills, between which a road leads to the neighbouring plain of Esdralon, and to Jerusalem. The convent is situated in the lower part of the village; and the church belonging to it, a very handsome editice, is erected over the grotto, or cave, in which, tradition says,

the Virgin Mary took up her residence.

The other objects of veneration in Nazareth are, 1. The Work-shop of Joseph, which is near the convent, and was formerly included within its walls; this is now a small chapel, perfectly modern, and lately whitewashed. 2. The Synagogue, where Christ is said to have read the Scriptures to the Jews, at present a church. 3. A Precipice without the town, where, they say, the Messiah leaped down to escape the rage of the Jews, after the offence his speech in the synagogue had occasioned. Here they shew the impression of his hand, made as he sprang from the rock.

THE HOLY SEPULCHRE AT JERUSALEM.

[See Plate, No. 69.]

The church of the Holy Sepulchre is very irregular, owing to the nature and situation of the places which it was designed to comprehend. It is nearly in the form of a cross. being one hundred and twenty paces in length, exclusive of the descent to the discovery of the Holy Cross, and seventy in breadth. It has three domes, of which that covering the Holy Sepulchre serves for the nave of the church. It is thirty feet in diameter, and is covered at top like the Rotunda at Rome. There is not any cupola, the roof being supported by large rafters, brought from Mount Lebanon.

On entering the church, you come to the Stone of Unction, on which the body of our Lord was anointed with myrrh and aloes, before it was laid in the sepulchre. Some say, that it is of the same rock as Mount Calvary; and others assert, that it was brought to this place by Joseph and Nicodemus, secret disciples of Jesus Christ, who performed this pious office, and that it is of a greenish colour. Be that as it may, on account of the indiscretion of certain pilgrims, who broke off pieces, it was found necessary to cover it with white marble, and to surround it with an iron railing, lest people should walk over it. This stone is cight feet, wanting three inches, in length, and two feet, wanting one inch, in breadth; and above it, eight lamps are kept continually burning.

The Holy Sepulchre is thirty paces from this stone, ex-

actly in the centre of the great dome; it resembles a small closet, hewn out of the solid rock. The entrance, which faces the east, is only four feet high, and two feet and a quarter broad. The interior of the sepulchre is nearly square. It is six feet, wanting an inch, in length, and six feet, wanting two inches, in breadth, and from the floor to the roof, eight feet one inch. There is a solid block of the same stone, which was left in excavating the other part: this is two feet four inches and a half high, and occupies half of the sepulchre, for it is six feet, wanting one inch, in length, and two feet and five-sixths wide. On this table the body of our Lord was laid, with the head towards the west, and the feet to the east; but, on account of the superstitious devotion of the Orientals, who imagine that, if they leave their hair upon this stone, God will never forsake them, and also, because the pilgrims broke off pieces, it has received a covering of white marble, on which mass is now celebrated. Forty-four lamps are constantly burning in this sacred place, and three holes have been made in the roof for the emission of the smoke. The exterior of the sepulchre is also faced with slabs of marble, and adorned with several columns, having a dome above.

The Holy Sepulchre is composed of three churches; that of the Holy Sepulchre, properly so called; that of Calvary; and the church of the Discovery of the Holy Cross. The first is built in the valley at the foot of Calvary, on the spot where tradition reports that the body of Christ was deposited. This church was in the form of a cross, the chapel of the Holy Sepulchre constituting, in fact, the nave It is circular, like the Pantheon at Rome, of the edifice. and is lighted only by a dome, beneath which is the sepul-Sixteen marble columns adorn the circumference of this rotunda: they are connected by seventeen arches, and support an upper gallery, likewise composed of sixteen columns and seventeen arches, of smaller dimensions than those of the lower range. Niches corresponding with the arches appear above the frieze of the second gallery, and the dome springs from the arch of these niches.

The origin of the church of the Holy Sepulchre is of high antiquity. The author of the Epitome of the Holy War asserts, that forty-six years after the destruction of Jerusalem by Vespasian and Titus, the Christians obtained

permission of Adrian to build, or rather to rebuild, a church over the tomb of their God, and to enclose, in the new city, the other places venerated by the Christians. This church, he adds, was enlarged and repaired by Helena, the mother of Constantine.

THE MOUNT OF OLIVES.

The following descriptions of the spots in the Holy Land, which excite a more particular interest, are extracted from Dr. Clarke's very valuable Travels in Europe, Asia, and Africa.

"As we advanced, our journey led through an open campaign country, until, upon our right, the guides she wed us the Mount, where it is believed that Christ preached to his disciples that memorable sermon, concentrating the sum and substance of every Christian virtue. We left our route to visit this elevated spot; and, having attained the highest point of it, a view was presented, which, for its grandeur, independently of the interest excited by the different objects contained in it, has no parallel in the Holy Land.

"From this situation we perceived that the plain, over which we had been so long riding, was itself very elevated. Far beneath appeared other plains, one lower than the other, and extending to the surface of the sea of Tiberius, or Sea of Galilee. This immense lake, almost equal, in the grandeur of its appearance, to that of Geneva, spreads its waters over all the lower territory, extending from the north-east towards the south-west, and then bearing east of Its eastern shores present a sublime scene of mountains, extending towards the north and south, and seeming to close it in at either extremity, both towards Chorazin, where the Jordan enters, and the Aulon, or Campus-magnus, through which it flows to the Dead Sea. The cultivated plains reaching to its borders, which we beheld at an amazing depth below our view, resembled, by the various hues their different produce exhibited, the motley pattern of a vast carpet. To the north appeared snowy summits, towering, beyond a series of intervening mountains, with unspeakable greatness. We considered them as the summits of Libanus; but the Arabs belonging to our caravan called the principal eminence Jebel el Sieh, saving it was near Damascus; probably, therefore, a part of the chain of

Libanus. This summit was so lofty, that the snow entirely covered the upper part of it; not lying in patches, as I have seen it, during summer, upon the tops of very elevated mountains, (for instance, upon that of Ben Nevis, in Scotland,) but investing all the higher part with that perfect white and smooth velvet-like appearance which snow only exhibits when it is very deep; a striking spectacle in such a climate, where the beholder, seeking protection from a burning sun, almost considers the firmament to be on fire."

OTHER REVERED SITES.

"As we rode towards the Sea of Tiberius, the guides pointed to a sloping spot from the heights upon our right. whence we had descended, as the place where the miracle was accomplished by which our Saviour fed the multitude: it is therefore called The Multiplication of Breud; as the Mount above, where the Sermon was preached to his Disciples, is called *The Mountain of Beatitudes*, from the expressions used in the beginning of that discourse. The lake now continued in view upon our left. The wind rendered its surface rough, and called to mind the situation of our Saviour's Disciples, when, in one of the small vessels which traverse these waters, they were tossed in a storm, and saw Jesus in the fourth watch of the night, walking to them upon the waves. Often as this subject has been painted, combining a number of circumstances adapted for the representation of sublimity, no artist has been aware of the uncommon grandeur of the scenery, memorable on account of the transaction. The Lake of Gennesareth is surrounded by objects well calculated to heighten the solemn impression made by such a picture; and, independent of the local feelings likely to be excited in its contemplation. affords one of the most striking prospects in the Holy Land.

"Along the borders of this lake may still be seen the remains of those ancient tombs, hewn by the earliest inhabitants of Galilee, in the rocks which face the water. Similar works were before noticed among the Ruins of Telmessus. They were deserted in the time of our Saviour, and had become the resort of wretched men, afflicted by diseases, and made outcasts of society; for in the account of the cure performed by our Saviour upon a maniac in the coun-

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try of the Gadarenes, these tombs are particularly alladed to; and their existence to this day, (although they have been neither noticed by priests nor pilgrims, and have escaped the ravages of the Empress Helena, who would undoubtedly, have shaped them into churches,) offers strong internal evidence of the accuracy of the Evangelist who has recorded the transaction: 'There met him out of the tombs a man with an unclean spirit, who had his dwelling among the tombs.'"

NAPOLOSE, OR SICHEM.

"There is nothing in the Holy Landsoner than the view of this city from the surrounding heights. As the traveller descends towards it from the hills, it appears luxuriantly embosomed in the most delightful and fragrant bowers, half concealed by rich gardens, and by stately trees collected into groves, all around the bold and beautiful valley in which it stands. The traveller, directing his footsteps towards its ancient sepulchres, as everlasting as the rocks wherein they are hewn, is permitted, upon the authority of sacred and indelible record, to contemplate the spot where the remains of Joseph, of Eleazar, and of Joshua, were severally deposited.

"In the time of Alexander the Great, Sichem was considered as the capital of Samaria. Its inhabitants were called Samaritans, not merely as people of Samaria, but as a sect at variance with the other Jews. They consisted principally of deserters from Judea. The principal object of veneration among them is JACOB'S WELL, over which a church was formerly erected. This is situated at a small distance from the town, in the road to Jerusalem, and has been visited by pilgrims of all ages; but particularly since the Christian æra, as the place where our Saviour revealed himself to the woman of Samaria.

MOSQUE OF OMAR.

DOCTOR CLARKE, on viewing this Mosque, observes, that "the sight was so grand, that he did not hesitate in pronouncing it the most magnificent piece of architecture in the Turkish empire; and, considered externally, far superior to the mosque of St. Sophia in Constantinople. By the sides of the spacious area in which it stands, are certain

MOSQUE OF ST. SOPHIA AT CONSTANTINOPLE. 572 vaulted remains; these plainly denote the masonry of the ancients; and evidence may be adduced to prove, that they belonged to the foundations of Solomon's temple. He observed also that reticulated stucco, which is commonly considered as an evidence of Roman work. Phocas believed the whole space surrounding this building to be the ancient area of the temple; and Golius, in his notes upon the Astronomy of Alferganes, says, the whole foundation of the original edifice remained. As to the mosque itself, there is no building at Jerusalem that can be compared with it, either in beauty or riches. The lofty Savacenic pomp so nobly displayed in the style of the building; its numerous arcades; its capacious dome, with all the stately decorations of the place; its extensive area, paved and variegated with the choicest marbles; the extreme neatness observed in every avenue towards it; and, lastly, the sumptuous costume observable in the dresses of all the Eastern devotees, passing to and from the sanctuary, make it altogether one of the finest sights the Mahometans have to boast."

MOSQUE OF ST. SOPHIA AT CONSTANTINOPLE.

THE dome of this celebrated structure is one hundred and thirteen feet in diameter, and is built on arches, sustained by vast pillars of marble. The pavement and staircase are also of marble. There are two rows of galleries supported by pillars of party-coloured marble, and the entire roof is of fine mosaic work. In this mosque is the superb tomb of the Emperor Constantine, for which the Turks have the highest veneration.

Beside the above, two other mosques attract the particular notice of travellers who visit the Turkish capital. That of the Valide-Sultan, founded by the mother of Mahomed IV, is the largest, and is built entirely of marble. Its proportions are stupendous; and it boasts the finest symmetry. The mosque of Sultan Solyman is an exact square, with four fine towers in the angles: in the centre is a noble cupola, supported by beautiful marble pillars. Two smaller ones at the extremities are supported in the same manner. The pavement and gallery surrounding the mosque are of marble; and under the great cupola is a fountain, adorned with such finely-coloured pillars, that they can scarcely be deemed of

natural marble. On one side is the pulpit, of white marble; and on the other the little gallery for the grand Signior.—
A fine staircase leads to it; and it is built up with gilt lattices. At the upper end is a kind of altar, on which the name of God is inscribed: and before it stand two candlesticks, six feet in height, with wax candles in proportion. The pavement is spread with fine carpets, and the mosque illuminated by a vast number of lamps. The court leading to it is very spacious, with galleries of marble, supported by green columns, and covered by 28 leaden cupolas on the sides, with a fine fountain in the centre.

The mosque of Sultan Selim I. at Adrianople is another surprising monument of Turkish architecture. It is situated in the centre and most elevated part of the city, so as to make a very noble display. The first court has four gates. and the innermost three; both being surrounded by cloisters, with marble pillars of the Ionic order, finely polished, and of very lively colours: the entire pavement is of white marble, and the roof of the cloisters is divided into several cupolas or domes, surmounted with gilt balls. In the midst of each court are fine fountains of white marble; and, before the grand entrance, is a portico, with green marble pillars, provided with five gates. The body of the mosque is one prodigious dome, adorned with lofty towers, whence the imaums, or priests, call the people to prayers. The ascent to these towers are very artfully contrived: there is but one door, which leads to three different staircases, going to three different stories of the tower, in such a manner, that three priests may ascend and descend, by a spiral progress, without meeting each other.

The walls of the interior are inlaid with porcelain, ornamented with small flowers and other natural objects, in very lively colours. In the centre hangs a vast lamp of gilt silver, besides which there are at least two thousand smaller ones: the whole, when lighted, have a very splendid effect.

BUINS OF CARTHAGE.

THE remains of the grandeur and magnificence of Carthage, the rival of Rome, and one of the most commercial cities of the ancient world, are not so striking as might be expected; and, at a little distance, can scarcely be distinguished from the ground on which they lie. The vestiges of

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a series of vaults, communicating with each other, and are bordered throughout their whole length by a corridor. The smaller reservoir has a greater elevation, and lies near the

Cothon or inner port.

The ruins of the noble aqueduct which conveyed the water into the larger cisterns, may be traced as far as Zawan and Zungar, at least fifty miles distant. This must have been a truly magnificent, and at the same time, a very expensive work. That part of it which extends along the peninsula was beautifully faced with stone. At Arriana, a village to the north of Tunis, are several entire arches 70 feet high, and supported by piers 16 feet square. The water-channel is vaulted over, and plastered with a strong cement. A person of an ordinary height may walk upright in it; and at intervals are apertures, left open, as well for the admission of fresh air, as for the convenience of cleansing it. The water-mark is nearly three feet high; but it is impossible to determine the quantity daily conveyed to Carthage by this channel, without knowing the angle of descent, which, in its present imperfect state, cannot be ascertained.

Temples were erected at Zawan and Zungar, over the fountains by which this aqueduct was supplied. That at Zungar appears to have been of the Corinthian order, and terminates very beautifully in a dome with three niches, probably intended for the statues of the divinities of the spring.

THE PLAIN OF TROY.

According to Homer's description of the Trojan territory, it combined certain prominent and remarkable features, not likely to be affected by any lapse of time. Of this nature was the Hellespont; the Island of Teffedos; the Plain itself; the river by whose inundations it was occasionally overflowed; and the mountain whence that river issued. The following is an abstract of Dr. Clarke's accurate account of the vestiges of high antiquity contained in this truly classic spot.

We entered an immense plain, in which some Turks, were engaged hunting wild-boars. Peasants were also employed in ploughing a deep and rich soil of vegetable carth. Proceeding towards the east, and round the bay distinctly pointed out by Straho, as the harbour in which the Grecian fleet was stationed, we arrived at the Sepulchie of upon the ancient Rhoetean Promontory. The view

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tion afformed of the Helbergman and the Class of Peny is one of the first the country affords.

"From the Junious we proved over a leadly country to Hall Edg, a vill go cont the Thymbrian, in whose decisity we had been introceed to sak the region of a temple mee arrent to the Haymbrian a path. The mine we found were rather the remains in the temple that of now. The math to were readlessable values was over the astronoment and transfer that the astronoment of article, granter, and decay mater in modular meet. Don't, land, and then there reprisely by dispersion in all divisions, and some of these mass of great brainty. We observed a base relief a personning a person on hereafted present a tree the name of mater; also a beautiful representation, employed a present in his reserved by two soily secured.

At the fown or village of Telshinab, we national very machineable commins of ancient empirical but in such a state of discouler and office, that no precise description of their can be given. The most considerable are upon the open of a lill eather Region Meaning, must be town, or the most of a beautiful given of ord, free, transle the either of Tallfet. There the runs of a Darie temple of a not mostle by largest in the most arribing memory mands of the largest in the most arribing memory made special of any majoritation and appeals and pulsars. All replies may majoritate to some peculiar mustals in which is also a non-eathy that to their testion.

We proceed allower towards the plain, and measures unclosed it. Then a transless of early consistable case and structure there can attention, for a chort trans, from the coron educate of our percent. This termber, or a main consistation and very regular structure, acquire after their archests. Of the press actinging the doubt replacement of the person accompanied to very the developing seguidance of the authority. You the configuration of the person of the serious of frameworks the consistent of the serious of the serious of frameworks to recommend to the serious of the

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the mouth of the Mender. If the Poems of Homer, with reference to the Plain of Troy, have similarly associated an artificial tumulus and a natural mound, a conclusion seems warranted, that these are the objects to which he alludes. This appears to be the case in the account he has given of the Tomb of Ilus and the Mound of the Plain.

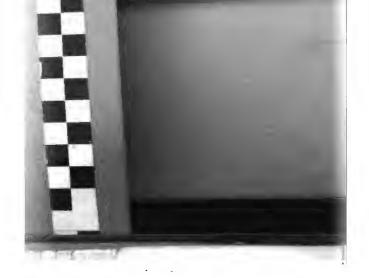
"From this tomb we descended into the plain, when our guides brought us to the western side of it, near its southern termination, to notice a tunulus, less considerable than the last described, about three hundred paces from the mound, almost concealed from observation by being continually overflowed, upon whose top two small oak

trees were then growing.

"We now came to an elevated spot of ground, surrounded on all sides by a level plain, watered by the Callifat Osmack, and which there is every reason to believe the Simoisian. Here we found, not only the traces, but also the remains of an ancient citadel. Turks were then employed raising enormous blocks of marble, from foundations surrounding the place; possibly the identical works constructed by Lysimachus, who fenced New Ilium with a All the territory within these foundations was covered by broken pottery, whose fragments were parts of those ancient vases now held in such high estimation. ny Greek medals had been discovered in consequence of the recent excavations made there by the Turks. these medals, bearing indisputible legends to designate the people by whom they were fabricated, have also, in the circunistances of their discovery, a peculiar connection with the ruins here, they may be considered as indicating, with tolerable certainty, the situation of the city to which they belonged. These ruins evidently appear to be the remains of New Ilium; whether we regard the testimony afforded by their situation, as accordant with the text of Strabo, or the discovery there made of medals of the city."

The conclusions relative to Troas, drawn by this learned writer, are as follows:—" That the river Mender is the Scannander of Homer, Strabo, and Pliny. The amnismanigabilis of Pliny flows into the Archipelago, to the south of Sigeum. That the Aianteum, or Tomb of Ajax, still remains, answering the description given of its situation was ancient authors, and thereby determining also the exact







"As we drew near to the walls, we beheld the vast CE-CROPIAN CITADEL, crowned with temples that originated in the veneration once paid to the memory of the illustrious dead, surrounded by objects telling the same theme of sepulchral grandeur, and now monuments of departed greatness, gradually mouldering in all the solemnity of ruin. So paramount is this funeral character in the anproach to Athens from THE PIREEUS, that, as we passed the hill of THE MUSEUM, which was, in fact, an ancient cemetery of the Athenians, we might have imagined ourselves to be among the tombs of Telmessus, from the number of the sepulchres hewn in the rock, and from the antiquity of the workmanship, evidently not of later date than any thing of the kind in Asia Minor. In other respects the city exhibits nearly the appearance so briefly described by Strabo eighteen centuries before our coming; and, perhaps, it wears a more magnificent aspect, owing to the splendid remains of Hadrian's Temple of Olympian Jove, which did not exist when Athens was visited by the Disciple of Xenarchus The prodigious columns belonging to this temple appeared full in view between the Citadel and the bed of the Ilissus: high upon our left rose the Acropolis; in the most impressive grandeur: an advanced part of the rock upon the western side of it is the Hill of the Areopagus, where St. Paul preached to the Athenians, and where their most solemn tribunal was held. Beyond all, appeared the beautiful Plain of Athens, bounded by Mount Hymettus. We rode towards the craggy rock of the Citadel, passing some tiers of circular arches at the foot of it; these are the remains of the Odeam of Herodes Atticus, built in memory of his wife Regilla. Thence continuing to skirt the base of the Acropolis, the road winding rather towards the north, we saw also, upon our left, scooped in the solid rock, the circular sweep on which the Athenians were wont to assemble to hear the plays of Æschylus, and where the Theatre of Bacchus was afterwards constructed.

"We proceeded towards the east, to ascend Mount Auchesmus, and to enjoy in one panoramic survey the glorious prospect presented from its summit, of all the antiquities and natural beauties in the Athenian Plain.—We ascended to the commanding eminence of the Mount, once occupied by a Temple of Anchesmian Jupiter. The Pa-



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consists of two rocky mountains, covered with trees as brushwood. Near the landing-place is the figure of an e phant, as large as life, shaped out of a rock, and m to have given its name to the island. Having ascen mountain by a narrow path, the visitor reaches the excavation which has so long excited the attention of the curious. and afforded such ample scope for the discussion of antiquarians. With the strongest emotions of surprise and admiration, he beholds four rows of massive col out of the solid rock, uniform in their order, and placed at regular distances, so as to form three magnificent avenues from the principal entrance to the grand idol which ter-minates the middle vista; the general effect being beightened by the blueness of the light, or rather gloom, peculiar to the situation. The central image is composed of three colossal heads, reaching nearly from the floor to the roof, a height of fifteen feet. Hindoo mythology, BRAHMA, VASHNOO, and SERVA, in It represents the triad deity in the the characters of the creator, preserver, and destroyer. middle face displays regular features, and a mildand serene character; the towering head-dress is much ornamented, as are those on each side, which appear in profile, lofty, and richly adorned with jewels. The countenance of Vishnoo has the same mild aspect as that of Brahma; but the visage of Seeva is very different,-severity and revenge, characteristic of his destroying attribute, are strongly depicted; one of the hands embraces a large CORRA DE CAPELLO; while the others contain fruit, flowers, and blessings for mankind, among which the lotos and pomegranate are readily distinguishable. The former of these, the lotus, so often introduced into the Hindoo mythology, forms a prin cipal object in the sculpture and paintings of their temples, is the ornament of their sacred lakes, and the most conspicuous beauty in their flowery sacrifices.

On either side of the Elephanta triad is a gigautic figure leaning on a dwarf, an object frequently introduced in these excavations. The giants guard the triple deity, and separate it from a large recess filled with a variety of figures, male and female, in different attitudes; they are in tolestable proportion, but do not express any particular character

countenance: one conspicuous female, like the Ama-







terraneous chambers, sufficiently to discriminate objects in that sombre light. We remained for several minutes without speaking, or looking particularly at each other: at length, when more familiarized to the cavern, my companion still remaining silent, I expressed some fear of having been too warm in my description, and that like most other objects, the reality fell short of the anticipated pleasure. He soon relieved my anxiety by declaring, that however highly he had raised his imagination, he was so absorbed in astonishment and delight, on entering this stupendous scene, as to forget where he was. He had seen the most striking objects of art in Italy and Greece; but never any thing which filled his mind with such extraordinary sensations." So enraptured was this artist with the spot, that after staying until a late hour, he quitted it most reluctantly.

The caves of the Isle of Elephanta cannot be sufficiently admired, when the immensity of such an undertaking, the number of artificers employed, and the extraordinary genius of its projector, are considered, in a country until lately accounted rude and barbarous by the now enlightened nations of Europe. Had this work been raised from a foundation, like other structures, it would have excited the admiration of the curious; but when the reflection is made, that it is hewn inch by inch in the hard and solid rock, how great must the astonishment be at the conception and com-

pletion of the enterprize!

TEMPLES OF SALSETTE.

High over-head, sublime,
The mighty gate-way's storied roof was spread,
Dwarfing the puny piles of younger time.
With the deeds of days of yore,
The ample roof was sculptured o'cr,
And many a god-like form there met the eye,
And many an emblemediate of mystery.
Such was the city, whose superb abodes
Seem'd scoop'd by giants for the immortal gods.
Now all is silence dread,
Silence profound and dead,
The everlasting stillness of the deep!

SOUTHEY.

THE excavations of the Island of Salsette, also contigious to Bombay, are hewn in the central mountains. The great temple is excavated at some distance from the summit of a

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There manners, his consulantog situation. This stypenday were to appear to at annex feet bane, thirty eight while, and al a progressmente helpfit, bewa and at she with rock, and formany an olderny square, with a flated common rand. If the were so desided onto these autou by to other enhancements, argeilst to the amount bessler, a pile of building to be as long as it was mide, ad one or the extremides of which templasted in a homer chi, two passent calmon forming a emerged nero in the conter, and heaving a narrow walk between the enhance and the wall. In these hamilted the Roman commitime of the east frequently administrated parior. This mayuniform estabation at Salarite appears to be unlike salar place, while agels, should door, incomable lives a place of more little; connects the temporation of the trought, breature the mathere's to a circular pile of wolld are k, names on fout lands. and forth eight in christialization, most include a minecounting of the lineaux, the exceled electry albeited in in the descention of the pumples of Elephants for the e trees. plotters are not set means, but are kind of a highern, compense of a graph out the others, which me in proper Undefined by a story my esterily made, and are Rich temperating sing. Bereat love hery but in an agrantiant story and in the smanth of other a namedon the while, house . Appliants, horses, times, and mounts of different kinds,

The last pulsas and may are said at the possesses there the also a positive process at a mach grander approximate their the largest case extlement the Edgehands, whitever their council rates, in duly card the results of the temple, results about a state of the extreme is in the many conditions the temple, results about a state of machines and resourced duly and resourced many area extensive and described a state of a state of

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of two rooms, a portice and benches, cut in the rock. To each is annexed a cistern of about three cubic feet, also hewn in the rock, for the preservation of rain-water. Some of these excavations are larger and better finished than others; and a few, although inferior in size and decoration, in their general effect resemble the principal temple.

The whole appearance of this excavated mountain indicates it to have had a city hewn in its rocky sides, capable of containing many thousand inhabitants. The largest temple was, doubtless, their principal place of worship; and the smaller, on the same plan, inferior ones. The rest were appropriated as dwellings for the inhabitants, differing in size and accommodation according to their respective ranks in society; or, as it is still more probable, these habitations were the abode of religious brahmins, and of their pupils, when India was the nursery of art and science, and the nations of Europe were involved in ignorance and barbarism.

MAUSOLEUM OF HYDER ALLY.

[Se: Plate, No. 28.]

This splendid monument of oriental grandeur is situated at the western extremity of the great garden of Seringapatum, a city of Hindostan, and capital of the Mysore territory. It is surrounded by a grove of beautiful cypress. trees, and was erected by Tippoo Saib in honour of the deceased sovereign, his father. Beneath tombs of black marble, elevated about eighteen inches from the ground. lie the bodies of Hyder Ally, his consort, and Tippoo Saib. They are covered with rich cloths, and have canopies over them. The whole of this sumptuous edifice is, together with its dome, supported by brilliantly-polished black marble columns. It is surrounded by a magnificent area, within which the fakirs have cells allotted to them; and on an elevated platform are the tombs of several faithful servants. The mosque annexed to it is flanked by two towers. The Moulahs stationed there are, through the liberality of the British government, still allowed two thousand pagodas per annum to read the Koran; and three pagodas are daily distributed in charity at the mausoleum,



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deep vallies and over wide rivers, by means of arches : ht many parts it is doubled or trebled, to command important asses; and at the distance of nearly every hundred varils a tower or mussive bestion. In extent is computed as 1,500 miles; but in some parts, where less danger is apprehended, it is not equally strong or complete, and towards the N. W. consists merely of a strong rampart of earth.— Near Koopekoo it is twenty-five feet in height, and the top about fifteen feet thick: some of the towers, which are square, are forty-eight feet high, and about forty feet in width. The stone employed in the foundations, angles, &c. is a strong grey granite; but the materials for the greater part consist of blulsh bricks, and the mortar is remarkably pure and white.

The area of the construction of this great barrier, which has been and will continue to be the wonder and admiration of ages, is considered by Sir George Staunton as having been absolutely ascertained; and he asserts that it has existed for two thousand years. In this assertion he appears to have followed Du Halde, who informs us that "this prodigious work was constructed two hundred and fifteen years before the birth of Christ, by order of the first Emperor of the family of Tsin, to protect three large provinces from the irruptions of the Tartars." However, in the History of China, contained in his first volume, he ascribes this erection to the second Emperor of the dynasty of Tsin, named Ti; and the date immediately preceding the Chi Hoang Ti; and the date immediately preceding the wirth of Christ. House suspicions may arise, not only conterning the spech when this work was undertaken, but also relatively to the purity and precision of the Chinese annals on peneral. Mr. Bell, who resided some time in China, and whose travels are deservedly esteemed for the accuracy of their information, assures us that this wall was built somewhere about the year 1160, by one of the Emperors, to prevers the frequent incursions of the Monguls, whose numerrus causily used is tavage the provinces, and effect their esapar before an army could be assembled to oppose them. Between officers en that this wall is not mentioned by any oriental geographer whose writings boast a higher and than three hundred years; and it is surprising that it should the energy diarro Paulo, who, admitting that he entered

deep vallies and over wide rivers, by means of arches: in many parts it is doubled or trebled, to command important passes; and at the distance of nearly every hundred yards is a tower or massive bastion. Its extent is computed at 1500 miles; but in some parts, where less danger is apprehended, it is not equally strong or complete, and towards the N. W. consists merely of a strong rampart of earth.

Near Koopekoo it is twenty-five feet in height, and the top about fifteen feet thick: some of the towers, which are square, are forty-eight feet high, and about forty feet in width. The stone employed in the foundations, angles, &c. is a strong grey granite; but the materials for the greater part consist of bluish bricks, and the mortar is remarkably pure and white.

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deep vallies and over wide rivers, by means of arches: in many parts it is deabled or trebled, to command important Passes; and at the distance of nearly every hundred yards. Passes; and at the distance of nearly every hundred yards 1500 miles; but in some parts, where less danger is apprehended, it is not equally strong or complete, and towards the N. W. consists merely of a strong rampart of earth.—Near Koopekoo it is twenty-five feet in height, and the top about fifteen feet thick: some of the towers, which are square, are forty-eight feet high, and about forty feet in ridth. The stone employed in the foundations, angles, &c. is a strong grey granite; but the materials for the greater part cousist of blaish bricks, and the motoral is remarkably pure and white.

The area of the construction of this great barrier, which

has been and will continue to be the wonder and admiration of ages, is considered by Sir George Staunton as having been absolutely ascertained; and he asserts that it has existed for two thousand years. In this assertion he appears to have followed Du Halde, who informs us that "this prodigious work was constructed two hundred and fifteen years before the birth of Christ, by order of the first Emperor of the family of Tsin, to protect three large provinces from the irruptions of the Tartars." However, in the History of Claim, countried in his front volume, he ancelled the very men frethe second Emperor of the dynamic of Thin, named Chi Houng Ti; and the date transcriberely present the agreetive of this conjutamentum in the case \$47 before birth of Child. Hence onepretuos need a to my ante cerning the sports when the west week. gelinivoly to the puricy and present in general. Mr. R. D. is a seeker where the print of the property Chair Jugar gratten, good

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Vi. 12 - Consult Made of China.



No. 13. - Natural Road under the Mountain of Fliffeld.

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China by a different route, can hardly be supposed, during his long residence in the north of China, and in the country of the Monguls, to have remained ignorant of so stupendous a work. Amid these difficulties, it may be reasonably conjectured, that similar modes of defence had been adopted in different ages; and that the ancient rude barrier, having fallen into decay, was replaced, perhaps after the invasion of Singis, by the present erection, which, even from its state of preservation, can scarcely aspire to a very remote antiquity.

PORCELAIN TOWER AT NANKIN.

This elegant and commodious building, a very correct idea of which may be formed from the cut, may be regarded as a fine specimen of oriental pagodas. The tower is about two hundred feet in height, and derives its name from its having a chain or porcelain coating. The Portuguese were the first to bestow on these superb edifices the title of pagodas, and to attribute them to devotional purposes.—There can be little doubt, however, that ir many justances they have been rather exected as public memorials or ornaments, like the columns of the Greeks and Romans.

Mr. Ellis in his Journal of the late Embassy to China, relates that, in the company of three gentlemen of the Embassy, he succeeded in passing completely through the uninhabited part of the city of Nankin, and in reaching the gateway visible from the Lion Hill. The object of the party was to have penetrated through the streets to the Porcelain Tower, apparently distant two miles. To this, however, the soldiers who accompanied them, and who from their willingness in allowing them to proceed thus far, were entitled to consideration, made so many objections, that they were forced to desist, and to content themselves with proceeding to a temple on a neighbouring hill, from which they had a complete view of the city. From this station the Porcelain Tower presented itself as a most magnificent object.

THE SHOEMADOO AT PEGU.

[See Plate, No. 72.]

THE object in Pegu that most attracts and most merits notice, says Mr. Symes in his Embassy to AyA, is the

noble edifice of Shoemadoo, or the Golden Supreme .--This extraordinary pile of buildings is erected on a double terrace, one raised upon another. The lower and greater terrace is about ten feet above the natural level of the ground, forming an exact parallelogram: the upper and lesser terrace is similar in shape, and rises about twenty feet above the lower terrace or thirty above the level of the country. I judged a side of the lower terrace to be 1391 feet; of the upper 684. The walls that sustained the sides of the terrace, both upper and lower, are in a ruinous state; they were formerly covered with plaster. wrought into various figures; the area of the lower is strewed with the fragments of small decayed buildings, but the upper is kept free from filth, and is in tolerable good order. There is reason to conclude that this building and the fortress are coeval, as the earth of which the terraces are composed appears to have been taken from the ditch; there being no other excavation in the city, or in its neighbourhood, that could have afforded a tenth part of the quantity.

The terraces are ascended by flights of stone steps, which are now broken and neglected. On each side are dwellings of the Rhahaans, raised on timbers four or five feet from the ground; these houses consist only of a large hall: the wooden pillars that support them are turned with neatness; the roofs are covered with tiles, and the sides are made of boards; and there are a number of bare benches in every house, on which the Rhahaans sleep; but we saw

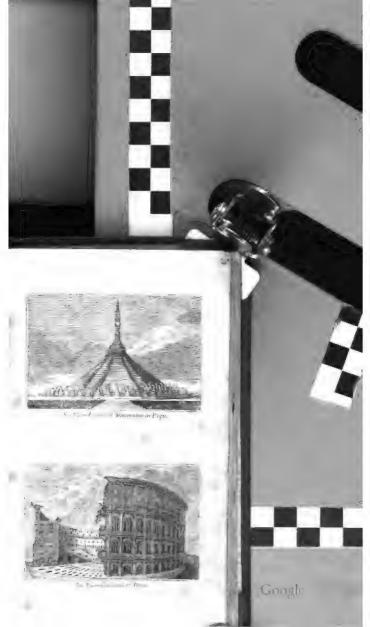
no other furniture.

Shoemadoo is a pyramidical building composed of brick and mortar, without excavation or aperture of any sort; octagonal at the base, and spiral at the top; each side of the base measures 162 feet; this immense breadth diminishes abruptly, and a similar building has not unaptly been compared in shape to a large speaking trumpet.

Six feet from the ground there is a wide projection that surrounds the base, on the plane of which are fifty-seven small spires of equal size, and equidistant; one of them measured twenty-seven feet in height, and forty in circumference at the bottom. On a higher ledge there is another row consisting of fifty-three spires of similar shape and measurement.

reat variety of mouldings encircle the building;

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and ornaments some what resembling the fleur-de-lys surround the lower part of the spire; circular mouldings likewise girt it to a considerable height, above which there are ornaments in stucco not unlike the leaves of a Corinthian capital; and the whole is crowned by a Tee, or umbrella, of open iron-work, from which rises a rod with a gilded penuant.

The tee or umbrella is to be seen on every sacred building that is of a spiral form; the raising and consecration of this last and indispensible appendage, is an act of high religious solemnity, and a season of festivity and relaxation. The present king bestowed the tee that covers Shoemadoo. It was made at the capital; and many of the principal nobility came down from Ummerapoora to be present at the ceremony of its elevation.

The circumference of the tee is fifty-six feet; it rests on an iron axis fixed in the building, and is farther secured by large chains strongly rivetted to the spire. Round the lower rim of the tee are appended a number of bells, which

agitated by the wind, make a continual jingling.

The tee is gilt, and it is said to be the intention of the king to gild the whole of the spire. All the lesser pagodas are ornamented with proportionable umbrellas of similar workmanship, which are likewise encircled by small bells.

The extreme height of the edifice, from the level of the country, is 361 feet, and above the interior terrace, 331 feet.

On the south-east angle of the upper terrace there are two handsome saloons, or kioums, lately erected, the roofs composed of different stages, supported by pillars; we judged the length of each to be about sixty feet, and the breadth thirty: the ceiling of one is already embellished with gold leaf, and the pillars are lackered; the decoration of the other is not yet completed. They are made entirely of wood; the carving on the outside is laborious and minute: we saw several unfinished figures of animals and men in grotesque attitudes, which were designed as ornaments for different parts of the building. Some images of Gaudma, the supreme object of Birman adoration, lay scattered around.

At each angle of the interior and higher terrace, there

is a temple 67 feet high, resembling, in miniature, the great temple: in front of that, in the south-west corner, are four gigantic representations, in masonry, of Palloo, or the evil genius, half beast, half human, seated on their hams, each with a large club on the right shoulder. 'The Pundit who accompanied me, said that they resembled the Rakuss of the Hindoos. These are guardians of the temple.

Nearly in the centre of the east face of the area are two human figures in stucco, beneath a gilded umbrella; one, standing, represents a man with a book before him and a pen in his hand; he is called Thasiamee, the recorder of mortal merits and mortal misdeeds; the other, a female figure kneeling, is Mahasumdera, the protectress of the universe, so long as the universe is doomed to last; but when the time of general dissolution arrives, by her hand the world is to be overwhelmed and everlastingly destroyed.

A small brick building near the north-east angle contains an upright marble slab, four feet high, and three feet wide: there is a long legible inscription on it. I was told it was an account of the donations of pilgrims of only a

recent date.

Along the whole extent of the north face of the upper terrace, there is a wooden shed for the convenience of devotees who come from a distant part of the country. On the north side of the temple are three large bells of good workmanship, suspended nigh the ground, between pillars; several deers' horns lie strewed around; those who come to pay their devotions first take up one of the horns, and strike the bell three times, giving an alternate stroke to the ground: this act, I was told, is to announce to the spirit of Gaudma the approach of a suppliant. There are several low benches near the foot of the temple, on which the person who comes to pray, places his offering, commonly consisting of boiled rice, a plate of sweetmeats, or cocoanut fried in oil; when it is given, the devotee cares not what becomes of it; the crows and wild dogs often devour it in presence of the donor, who never attempts to disturb the animals. I saw several plates of victuals disposed of in this manner, and understood it to be the case with all that was brought.

There are many small temples on the areas of both terraces, which are neglected, and suffered to fall into decay. Numberless images of Gaudma lie indiscriminately scattered. A pious Birman who purchases an idol, first procures the ceremony of consecration to be performed by the Rhahaans; he then takes his purchase to whatever sacred building is most convenient, and there places it in the shelter of a kioum, or on the open ground before the temple; nor does he ever again seem to have any anxiety about its preservation, but leaves the divinity to shift for itself. Some of those idols are made of marble that is found in the neighbourhood of the capital of the Birman dominions, and admits of a very fine polish; many are formed of wood, and gilded, and a few are of silver; the latter, however, are not usually exposed and neglected like the others. Silver and gold is rarely used, except in the composition of household gods.

On both the terraces are a number of white cylindrical flags, raised on bamboo poles; these flags are peculiar to the Rhahaans, and are considered as emblematical of parity, and of their sacred function. On the top of the staff there is a henza, or goose, the symbol both of the Birman

and Pegu nations.

THE COLOSSAL FIGURE OF JUPITER PLUVIUS, OR STATUE OF FATHER APPENINE, AT PRATOLINO, IN STALL.

[See Plate, No. 74.]

STATUES above the ordinary size, were named by the ancients, Colossi, from a Greek word which signifies Members. That at Rhodes was the most famous, excuted by Carelus, a pupil of Lysippus. There were several at Rome; the most considerable was that of Ver pasian, in the amphitheatre, that bore the name of Colisar is Claudius caused a colossal statue of himself to be caused on a rock exposed to the sea waves, in front of the port of Ostium. Nero had his person and figure painted on a linear cloth, 120 feet in height. In the Court of the Capitol, and in the Place Farnesi, &c. are colossi, either entire or mutilated.

The space in which stands this enormous statue, is planted round, on all sides, with lofty fir and beech trees, the trunks of which are hid by a wood of laurel, wherein

niches have been cut for statues. The middle part is a green lawn, and at a little distance, is a semicircular basin of water, behind which rises the colossal statue of Father Appenine.

Enchased, as it were, in the groves, it can only be surveyed in front, and from a point of view marked by the

artist, in the adjoining engraving.

Elevated on a base to appearance irregular, and of itself lofty, at which the astonished spectator arrives through two ballustrades that run round the basih, this Colossus, at first, looks like a pyramidal rock, on which the hand of man might have executed some project analogous to what the statuary Stasicrates had conceived respecting Mount Athos,* and which Alexander nobly rejected. But soon he recognizes the genius of a pupil and worthy rival

of Michael Angelo.

It was, in fact, John of Bologna, who, by an inspiration derived from the ancients, has executed their beau ideal of Jupiter Pluvius. This name seems more suitable to the figure than that of Father Appenine, which has been assigned to it. The style, in point of magnitude, is of the largest, and the character of the head is in perfect conformity to the subject. His brows and front brave the tempest, and seem the region of the hoar frost; his locks desected in icicles on his broad shoulders, and the flakes of his immense beard resemble stalactites; his limbs seem covered with rime, but with no alteration in their contour, or in the form of the muscles.

To add to the extraordinary effect, about the head is a kind of crown, formed of little jetteaux, that drop on the shoulders and trickle down the figure, shedding a sort of supernatural lustre, when irradiated by the sun.

It would be difficult to imagine a composition more picturesque and perfect in all its proportions. The figure harmonizes with the surrounding objects, but its real mag-

^{*} Stasicrates proposed to Alexander, to transform Mount Athos into a most durable statue, and one that would be most prominent to a world of beholders. His left hand to contain a city, peopled with 10,000 inhabitants, and from the right a great river to flow, its waters descending to the sea. The proposition of this gigantesque monument was rejected by Alexander, exclaiming, "The passage of Mount Caucasus, the Tanais, and the Caspian, which have forced, shall be my monuments."









mitude is best shewn by comparison with the groupes promenading about the water, and which in comparison, at a certain distance, resemble pigmies. A nearer approach

exhibits a truly striking proportion of the limbs.

A number of apartments have been fabricated in the interior, and within the head is a beautiful belvidere, wherein the eye-balls serve for windows. The extremities are of stone; the trunk is of bricks overlaid with a mortar or cement that has contracted the hardness of marble, and which, when fresh, it was easy to model in due forms.

It is related in the life of John of Bologna, that several of his pupils, unaccustomed to work with hand, while engaged in this work, forgot the correct standard of dimensions, both as to the eye and hand, and that Father Appenine and his enormous muscles made them spoil a number of statues.

The greatest difficulty in the workmanship was to impress on the mass, the character of monumental durability. The artist has succeeded in uniting the rules of the statuary with those of construction, in combining the beauty of the one with the solidity of the other. All the parts refer to a common centre of gravity, and the members are arranged so as to serve for a scaffolding to the body, without impairing its dignity or magnitude.

The colossal statues of the ancients may have suggested the idea of this configuration, or, as before hinted, the artist may have aimed to represent the Jupiter Pluvius. However, it seems probable that Poussin, in his painting of the Plains of Sicily, has, from this, formed his Polyphemus, seated on the summit of a lofty rock. From the beauty of its proportions, and skill in the execution, all artists who have to work on colossal figures, ought to cherish the preservation of this, as an imposing object, that cannot be too profoundly studied.

THE HANGING TOWER OF PISA, IN TUSCANY.

This celebrated tower, likewise called Campanile, on account of its having been erected for the purpose of containing bells, stands in a square close to the cathedral of Pisa. It is built entirely of white marble, and is a beautiful cylinder of eight stories, each adorned with a round of

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columns, rising one above another. It inclines so far on one side from the perpendicular, that in dropping a plummet from the top, which is 188 feet in height, it falls 16 feet from the base. Much pains have been taken by connoisseurs to prove that this was done purposely by the architect; but it is evident that the inclination has proceeded from another cause, namely, from an accidental subsidence of the foundation on that side. The pillars are there considerably sunk; and this is also the case with the very threshold of ambition, meant to shew how far he could with safety deviate from the perpendicular, and thus display a novel specimen of his art, he would have shortered the pilasters on that side, so as to exhibit them entire, without the appearance of sinking.

THE COLISEUM AT ROME.

[See Plate, No. 75.]

On approaching the majestic ruins of this vast amplitheatre, the most stupendous work of the kind antiquity Can boast, a sweet and gently-moving astonishment is the first sensation which seizes the beholder; and soon afterwards the grand spectacle swims before him like a cloud. To give an adequate idea of this sublime building, is a task to which the pen is unequal: it must be seen to be duly appreciated. It is upwards of 1600 feet in circumference, and of such an elevation that it has been justly observed by a writer, Ammiamus, "the human eye scarcely measures its height." Nearly the one half of the external circuit still remains, consisting of four tiers of arcades, adorned with columns of four orders, the Doric, Ionian, Corinthian, and Composite. Its extent may, as well as its elevation, be estimated by the number of spectators it contained, amounting according to some accounts, to eighty thousand, and agreeably to others, to one hundred thousand.

Thirty thousand captive Jews are said to have been engaged by Vespasian, whose name it occasionally bears, in the construction of this vast edifice; and they have not discredited their forefathers, the builders of Solomon's temple, by the performance. It was not finished, however, until the reign of his son Titus, who, on the first day of its being opened introduced into the arena not less than 5000, or, according to Dio Cassius, 9000 wild beasts, between whom.

and the primitive Christians hold explice by the Romans combute noise hopels. At the combinion of this cruel episteche the total place was put under coner, and two the equation of the control of the control of the engagement. To reader the equation, represented a multitude of persons less making, exemples ented under, not becomes lessent explicit, and described tenter, not becomes lessent exert expressive with collect, and chosential topic interest exert expressive with collect, and the builde of the equations.

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Actium. Among its splendid monuments of antiquity, the Amphitheatre, being infinitely better preserved than those of Rome and Verona, is the finest monument of the kind now extant. It was built in the reign of Antonius Pius, who contributed a large sum of money towards its erection. It is of an oval figure, 1080 feet in circumference, sufficiently capacious to contain twenty thousand spectators. The architecture is of the Tuscan order, sixty feet high, composed of two open galleries, built one over another, consisting each of sixty areades. The entrance into the arena was by four great gates, with porticoes; and the seats, of which there were thirty, rising one above another, consisted of great blocks of stone, many of which still remain. the north gate, appear two bulls, in alto-relievo, extremely well executed, emblems which, according to the usage of the Romans, signified that the amphitheatre was erected at the expence of the people. In other parts are heads, busts, and other sculptures in bass-reliefs.

This magnificent structure stands in the lower part of the city, and strikes the spectator with awe and veneration. The external architecture is almost entire in its whole circuit. It was fortified as a citadel by the Visigoths, in the beginning of the sixth century: they raised within it a castle, two towers of which are still extant; and surrounded it with a broad and deep moat, which was filled up in the thirteenth century. In all the subsequent wars to which the city of Nismes was exposed, it served as the last refuge of the citizens, and sustained a great number of successive attacks; so that its fine preservation is almost miraculous.

TRAJAN'S PILLAR.

This historical column was erected at Rome by the Emperor Trajan to commemorate his victories over the Dacians, and is considered the master-piece of the splendid monuments of art elevated by that Emperor in the Roman capital. Its celebrity is chiefly owing to the beautifully-wrought bass-reliefs, containing about two thousand figures, with which it is ornamented. It stands in the middle of a square, to form which a hill, one hundred and forty feet in height, was levelled; and was intended, as appears by the inscription on its base, both as a tomb for the Emperor, and to display the height of the hill, which had thus with

incredible labour, been reduced to a plane surface. It was erected in the year 114 of the Christian era; and the Emperor Constantine, two centuries and a half afterwards, regarded it as the most magnificent structure by which Rome was even at that time embellished.

This pillar is built of white marble, its base consisting of twelve stones of enormous size, being raised on a socle, or foot of eight steps; withinside is a staircase illuminated by 44 windows. Its height, equalling that of the hill which had been levelled, to give place to the large square called THE FORUM ROMANUM, is 140 feet, being 35 fect less elevated than the Antonine column. The latter, the sculptured ornaments of which are not equally esteemed, is decorated with bass-reliefs representing the victories of Marcus Aurelius over the Marcomanni. A spiral stair-case of nearly 200 steps leads to the summit of this column.

MAISON CARREE, AT NISMES.

If the Amphitheatre of Nismes strikes the spectator with an idea of greatness and sublimity, the Maison Carree enchants him with the most exquisite beauties of architecture and sculpture. This fine structure, as is evidenced by the inscription discovered on its front, was built by the inhabitants of Nismes, in honour of Caius Cesar, and Lucius Cesar, grandchildren of Augustus, by his daughter Julia, the wife of Agrippa. It stands upon a pediment 6 feet high, is 82 feet long, 35 broad, and 37 in height, without reckoning the pediment. The body of it is adorned with 20 columns engaged in the wall; and the peristyle, which is open, with 10 detached pillars that support the entablature. are all of the Corinthian order, fluted and embellished with eapitals of the most exquisite sculpture: the frize and cornice are much admired, and the foilage is esteemed inimitable. The proportions of the building are so happily blended, as to give it an air of majesty and grandeur, which the most indifferent spectator cannot behold without emo-To enjoy these beauties, it is not necessary to be a connoisseur in architecture: they are indeed so exquisite that they may be visited with a fresh appetite for years together. What renders them still more interesting is, that they are entire, and very little affected, either by the ravages of time, or the havor of war. Cardinal Alberoni de-

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clared this elegant structure to be a jewel which deserved a cover of gold to preserve it from external injuries. An Italian painter, perceiving a small part of the roof repaired by modern French masoury, tore his hair, and exclaimed in a rage, "Zounds! what do I see? Harlequin's hat on

the head of Augustus!"

In its general architectural effect, as well as in all its details of sculpture and ornament, the Maison Carree of Nismes is ravishingly beautiful, and cannot be paralleled by any structure of ancient or modern times. That which most excites the astonishment of the admiring spectator, is to see it standing entire, like the effect of enchantment, after such a succession of ages, subjected as several of them were, to the ravages of the barbarians who overrun the most interesting parts of Europe!

THE PONT DU GARD.

[See Plates, No. 76, 77.]

This celebrated Roman monument is distant about three leagues from the city of Nismes. Instead of finding it in a ruinous condition, as he might reasonably have expected, the traveller on approaching it, is agreeably disappointed when he perceives that it looks as fresh as a modern bridge of a few years standing. The climate is either so pure and dry, or the free-stone with which it is built is so hard, that the very angles of the stones remain as acute as if they had been recently cut. A few of them have, indeed, dropped out of the arches; but the whole is admirably preserved, and presents the eye with a piece of architecture, so unatfectedly elegant, so simple, and, at the same time, so majestic, that it defies the most phlegmatic spectator to view it without admiration. It was raised in the Augustan age, by the Roman Colony of Nismes, to convey a stream of water between two mountains, for the use of that city. It stands over the river Gardon, a beautiful pastoral stream, brawling among rocks which form a number of pretty natural cascades, and overshadowed on each side by trees and shrubs. which add greatly to the rural beauties of the scene.

This elegant structure consists of three bridges, or tiers of arches, one above another; the first of six, the second of eleven, and the third of thirty-six arches. The height, comprehending the aqueduct on the top, is 174 feet 3 inch-

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the parts are seen to an equal advantage, without distinguishing itself above the rest. It appears neither extremely high, nor long, nor broad, because a just equality is preserved throughout. Although every object in this church is admirable, the most astonishing part of it is the cupola. On ascending to it, the spectator is surprised to find, that the dome which he sees in the church, is not the same with the one he had examined without doors, the latter being a kind of case to the other, and the stairs by which he ascends into the ball lying between the two. Had there been the outward dome only, it would not have been seen to advantage by those who are within the church; or had there been the inward one only, it would scarcely have been seen by those who are without; and had both been one solid dome of so great a thickness, the pillars would have been too weak to have supported it.

It is not easy to conceive a more glorious architectural display than the one which presents itself to the spectator who stands beneath the dome. If he looks upward, he is astonished at the spacious hollow of the cupola, and has a vault on every side of him, which makes one of the most beautiful vistas the eye can possibly have to penetrate. To convey an idea of its magnitude, it will suffice to say, that the height of the body of the church, from the ground to the upper part of its ceiling, is four hundred and thirty-two feet, and that sixteen persons may place themselves, without inconvenience, in the globular top over the dome, which is annually lighted, on the 29th of June, by four thousand lamps and two thousand fire-pots, presenting a

most delightful spectacle.

The vestibule of St. Peter's is grand and beautiful. Over the second entrance is a fine mosaic from Giotto, executed in the year 1303; find at the corners, to the right and left, are the equestrian statues of Constantine and Charlemagne. Of the five doors leading to the church itself, one, whiled the holy door, is generally shut up by brick-work, and is only opened at the time of the Jubilee. The middle gate is of bronze, with bass-reliefs.

Of the one hundred and thirty statues with which this church is adorned, that of St Peter is the most conspicuous: it is said to have been recast from a bronze statue of Jupiter potolinus. One hundred and twelve lamps are constant-

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ly burning around the tomb of this Saint; and the high altar close to it, on which the Pope alone reads mass, is overshadowed by a ceiling, which exceeds in loftiness that of any palace of Rome. The splendid sacristy was built by Pius VI. But by far the greatest ornaments of the interior are the excellent works in mosaic, all copied from the most celebrated pictures, which are thus guarded from oblivion.

The great and truly awful dome of St. Peter's is only two feet less in diameter than that of the Pantheon, being one hundred and thirty-seven feet; but it exceeds the latter in height by twenty feet, being one hundred and fifty-nine feet, besides the lantern, the basis pedestal of the top, the globular top itself, and the cross above it, which, collectively, measure one hundred and twenty feet. The roof of the church is ascended by easy steps; and here the visitor seems to have entered a small town, for he suddenly finds himself among a number of houses, which either serve as repositories of implements and materials for repairing the church, or are inhabited by the workmen. The dome, at the foot of which he now arrives, appears to be the parish-church of this town; and the inferior domes seem as if intended only for ornaments to fill up the vacuities. Add to this, that he cannot see the streets of Rome, on account of the surrounding high gallery, and its colossal statues; and the singularity of such a scene may be easily conceived. It is besides said, that a market is occasionally held here for the aerial inhabitants.

Although the adventurous stranger is now on the roof, he has still a great height to ascend before he reaches the summit of the dome. Previously to his engaging in this enterprise, he is conducted to the inside gallery of the dome. From this spot the people within the body of the church appear like children. The higher he goes, the more uncomfortable he finds himself, on account of the oblique walls over the narrow staircase; and he is often compelled to lean with his whole body quite to one side. Several marble plates are affixed in these walls, containing the names of the distinguished personages who have had the courage to ascend to the dome, and even to climb up to the lantern, and the top. The Emperor Joseph II. is twice mentioned; and Paul I. as Grand Duke. In some parts, where the stairs are too steep, more commodious steps of

wood have been placed: by these the lantern can be reached with greater facility; and the view which there waits the visitor, may be imagined without the aid of description; it is AN IMMENSE PANORAMA, BOUNDED BY THE SEA.

EDDYSTONE LIGHT-HOUSE.

[See Plate, No. 78.]

THE Eddystone Rocks, on which this celebrated Lighthouse is built, are situated nearly south-south-west from the middle of Plymouth-sound, being distant from the port of Plymouth nearly fourteen miles, and from the Promontory called Ramhead, about ten miles. They are almost in the line, but somewhat within it, which joins the Start and the Lizard Points; and as they lie nearly in the direction of vessels coasting up and down the Channel, they were necessarily, before the establishment of a light-house, very dangerous, and often fatal to ships under such circumstances. Their situation, likewise, relatively to the Bay of Biscay and the Atlantic Ocean, is such that they lie open to the swells of both from all the south-western points of the compass; which swells are generally allowed by mariners to be very great and heavy in those seas, and particularly in the Bay of Biscay. It is to be observed, that the soundings of the sea, from the south-west towards the Eddystone, are from eighty fathoms to forty, and that in every part, until the rocks are approached, the sea has a depth of at least thirty fathoms; insomuch that all the heavy seas from the southwest reach them uncontrouled, and break on them with the utmost fury.

The force and height of these seas are increased, by the circumstance of the rocks stretching across the channel, in a direction north and south, to the length of above one hundred fathoms, and by their lying in a sloping manner toward the south-west quarter. This striving of the rocks, as it is technically called, does not cease at low-water, but still goes on progressively; so that, at fifty fathoms westward, there are twelve fathoms of water; neither does it terminate at the distance of a mile. From this configuration it happens, that the seas are swollen to such a degree, in storins and keavy gales of wind, as to break ou the

rocks with the utmost violence.
It is not surprising, therefore, that the dangers to which

navigators were exposed by the Eddystone rocks should have made a great commercial nation desirous to have a light-house erected on them. The wonder is that any one should have had sufficient resolution to undertake its construction. Such a man was, however, found in the person of Mr. Henry Winstanley, of Littleburgh, in Essex. who, being furnished with the necessary powers to carry the design into execution, entered on his undertaking in 1696, and completed it in four years. So certain was he of the stability of his structure, that he declared it to be his wish to be in it "during the greatest storm which ever blew under the face of the heavens." In this wish he was but two amply gratified; for while he was there with his workmen and light-keepers, that dreadful storm began, which raged most violently on the night of the 26th of November, 1703; and of all the accounts of the kind with which history has furnished us, not any one has exceeded this in Great Britain, nor has been more injurious or extensive in its devastations. On the following morning, when the storm was so much abated, that an enquiry could be made, whether the lighthouse had suffered from it, not any thing appeared standing, with the exception of some of the large irons by which the work was fixed on the rock; nor were any of the people, nor any of the materials of the building ever found afterwards.

In 1709, another light-house was built of wood, on a very different construction, by Mr. John Rudyerd, then a silk-mercer on Ludgate-hill. This very ingenious structure, after having braved the elements for forty-six years, was burned to the ground in 1755. On the destruction of this light-house, that excellent mechanic and engineer Mr. Smeaton, was selected as the fittest person to build another. He found some difficulty in persuading the proprietors, that a stone building, properly constructed, would be in every respect preferable to one of wood; but having at length convinced them, he turned his thoughts to the shape which would be more suitable to a building so critically situated. Reflecting on the structure of the former buildings, it seemed to him a material improvement to procure, if possible, an enlargement of the base, without increasing the size of the waist, or that part of the building placed between the top of the rock and the top of the solid work. Hence he

thought a greater degree of strength and stiffness would be gained, accompanied with less resistance to the acting power. On this occasion, the natural figures of the waist, or bole of a large spreading oak, occurred to our sagacious engineer.

With those very enlightened views, as to the proper form of the superstructure, Mr. Smeaton began the work on the 2d of April, 1757, and completed it on the 4th of August, 1759. The rock which slopes towards the south-west, is cut into horizontal steps, into which are dovetailed, and united by a strong cement, Portland-stone and granite.— The whole to the height of thirty-five feet from the foundation, is a solid body of tones, engrafted into each other, and united by every means of additional strength that could be devised. The building has four rooms, one over the other, and at the top a gallery and lantern. The stone floors are flat above, but concave beneath, and are kept from pressing against the sides of the building by a chain let into the walls. It is nearly eighty feet in height, and since its completion has been assaulted by the fury of the elements, without suffering the smallest injury.

To trace the progress of so vast an undertaking, and to show with what skill and judgement this unparalleled engineer overcame the greatest difficulties, would far exceed

the limits of this work.

BELL ROCK LIGHT-HOUSE.

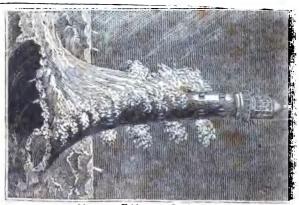
[See Plate, No. 78]

The Bell Rock, or Inch Cape, is situated on the northeast coast of Great Britain, twelve miles south-west from the town of Arbroath, in Fifeshire, and thirty miles northeast from St. Abb's Head, in the county of Berwick. It lies in the direct trace of the Firth of Tay, and of a great proportion of the shipping of the Frith of Forth, embracing a very extensive local trade. This estuary is besides the principal inlet on the northern coast of Britain, in which the shipping of the German Ocean and North Sea take refuge when overtaken by easterly storms. At neap-tides, or at the quadratures of the moon, the Bell Rock is scarcely uncovered at low-water; but in spring-tides, when the ebbs are greatest, that part of the rock which is exposed to view at low-water, measures about four hundred and twenty-seven





No. 78 .- Bell Rock Light-house.



No. 79 .- Eddystone Light-house.

and in largeth, by two loomined and thirty in the ofth count is the lone state of the thire, its average perpendicular hours have the entire of the sea is always hour lend. He and the square included its these proportionals, at very less takes, a cent around about a thousand lend in a routhwest direction, from the higher pass of the rock past described unique or grower.

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kind of rope-ladder, with wooden steps, hung out at ebbtide, and taken into the building again when the water covers the rock; but strangers to this sort of climbing are taken up in a kind of chair, by a small moveable crane projected from the door, from which a narrow passage leads to a stone staircase thirteen feet in height. Here the walks are seven feet thick; but they gradually diminish from the top of the staircase to the parapet wall of the light-room, where they measure one foot only in thickness. The upper part of the building is divided into six apartments for the use of the light-house keepers, and for containing the light house stores. The lower, or first of these floors, contains the water-tanks, fuel, and other bulky articles; the second, the oil-cisterns, glass, and other light-room stores; the third is occupied as a kitchen; the fourth is the bedroom; the fifth, the library, or stranger's room; and the upper apartment forms the light-room. The floors of the several apartments are of stone, and the communication from the one to the other is effected by wooden ladders, except in the case of the light-room, where every article being fire-proof, the steps are made of iron. In each of the three lower apartments are two windows; but the upper rooms have four windows each. The casements of the windows are double, and are glazed with plate-glass. having besides an outer storm-shutter, or dead-light, of timber, to defend the glass from the waves and spray of The parapet wall of the light-room is six feet in height, and has a door leading out to the balcony, or walk, formed by the cornice round the upper part of the building, which is surrounded by a cast-iron rail, curiously wrought This rail reposes on batts of brass, and like net-work. has a massive coping, or top-rail, of the same metal.

The light-room was, with the whole of its apparatus, framed and prepared at Edinburgh. It is of an octagonal figure, measuring twelve feet across, and fifteen feet in height, formed with cast-iron sashes, or window-frames, glazed with large plates of polished glass, measuring about two feet six inches, by two feet three, and the fourth of an inch in thickness. It is covered with a dome roof of copper, terminating in a large gilt ball, with a vent-hole in

the top.

The light is very powerful, and is readily seen at the dis

tance of seven leagues, when the atmosphere is clear. It is from oil, with Argand burners, placed in the focus of silver plated reflectors, measuring two feet over the lips, the silver surface being hollowed, or wrought to the parabolic curve. To the end that this splendid light may be the more easily distinguished from all the other lights on the coast. the reflectors are ranged on a frame with four faces, or sides. which, by a train of machinery, is made to revolve on a perpendicular axis once in six minutes. Between the observer and the reflectors, on two opposite sides of the revolving frame, shades of red glass are interposed in such a manner, that, during each entire revolution of the reflectors, two appearances, distinctly differing from each other, are produced: one is the common bright light familiar to all; but on the other, or shaded sides, the rays are tinged of a red colour. These red and bright lights, in the course of each revolution, alternate with intervals of darkness, which, in a very beautiful and simple manner, characterize this light.

As a farther warning to the mariner in foggy weather, two large bells, each weighing about twelve hundred, are tolled day and night by the same machinery which moves the lights. As these bells, in moderate weather, may be heard considerably beyond the limits of the rock, vessels, by this expedient, get warning to put about, and are thereby prevented from running on the rock in thick and hazy weather, a disaster to which ships might otherwise be liable, notwithstanding the erection of the light-house.

The establishment consists of a principle light-keeper, with three assistants, two of whom are constantly at the light-house, while the third is stationed at a tower erected at Arbroath, where he corresponds by signals with the

light-keepers at the rock.

This stupendous undertaking is highly creditable to Mr. Stevenson, the engineer, and does honour to the age in which it has been produced. The lights were exhibited, for the first time, on the 1st of February, 1811.

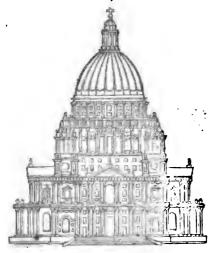
STONEHENGE.

[See Plate, No. 60.]

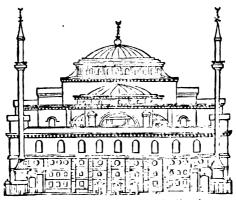
THIS celebrated monument of antiquity stands in the middle of a flat area near the summit of a hill, six miles distant from Salisbury. It is inclosed by a double circular bank and ditch, nearly thirty feet broad, after crossing which an ascent of thirty yards leads to the work. The whole fabric was originally composed of two circles and two ovals .-The outer circle is about 108 feet in diameter, consisting, when entire, of sixty stones, thirty uprights, and thirty imposts, of which there now remain twenty-four uprights only, seventeen standing, and seven down, three feet and a half asunder, and eight imposts. Eleven uprights have their five imposts on them at the grand entrance: these stones are from thirteen to twenty seet high. The smaller circle is somewhat more than eight feet from the inside of the outer one, and consisted of forty smaller stones, the highest measuring about six feet, nineteen only of which now remain, and only cleven standing. The walk between these two circles is The adytum, or cell is an 300) feet in circumference. eval formed of ten stones, from sixteen to twenty-two feet high, in pairs, and with imposts above thirty feet high, rising in height as they go round, and each pair separate, and not connected as the outer pair: the highest eight feet .-Within these are nineteen other smaller single stones, of which six only are standing. At the upper end of the adytum is the altar, a large slab of blue coarse marble, 20 inches thick, sixteen feet long, and four broad: it is pressed down by the weight of the vast stones which have fallen up-The whole number of stones, uprights and imposts, comprehending the altar, is 140. The stones, which have been by some considered artificial, were most probably brought from those called the grey weathers on Marlborough Downs, distant fifteen or sixteen miles; and if tried with a tool, appear of the same hardness, grain and colour. generally reddish. The heads of exen, deer and other beasts, have been found in digging in and about Stonehenge: and in the circumjacent barrows human bones. From the plain to this structure there are three entrances, the most considerable of which is from the north-east; and at each of them were raised, on the outside of the trench, two huge stones, with two smaller parallel ones within.

Geoffrey of Monmouth, in his history of the Britons. written in the reign of King Stephen, represents this monument as having been erected at the command of Aurelius Ambrosius, the last British king, in memory of 460 Briton

St. Paul's, London.



The exact relative dimensions of St. Paul's, at London, and the Mosque of Saint Sophia, at Constantinople.



Mosque of St. Sophia, Constantinople.



who were murdered by Hengist the Saxon. Polydore Virgil says that it was erected by the Britons as the sepulchral monument of Aurelius Ambrosius; and other writers consider it to have been that of the famous British queen Boadicea. Inigo Jones is of opinion that it was a Roman temple; and this conclusion he draws from a stone sixteen feet in length, and four in breadth, placed in an exact position to the eastward, altar-fashion. By Charlton it is ascribed to the Danes, who were two years master of Wiltshire: a tin tablet, on which were some unknown characters, having been dug up in the vicinity, in the reign of Henry VIII. This tablet, which is lost, might have given some information respecting its founders. Its common name, STONE-HENGE, is Saxon, and signifies a "stone gallows," to which the stones, having tranverse imposts, bear some resemblance. It is also called in Welch choir gour, or the giants' dance.

Mr. Grose, the antiquary, is of opinion that Doctor Stukely has completely proved this structure to have been a British temple, in which the Druids officiated. He supposes it to have been the metropolitan temple of Great Britain, and translates the words choir gour, "the great choir or temple." It was customary with the Druids to place one large stone on another for a religious memorial; and these they often placed so equably, that even a breath of wind would sometimes make them vibrate. Of such stones one remains at this day in the pile of Stonehenge .--The ancients distinguished stones erected with a religious view, by the name of ambrosiae petrae, amber stones, the word amber implying whatever is solar and divine. According to Bryant, Stonehenge is composed of these amber stones; and hence the next town is denominated Ambresburv.

ROCKING STONES.

THE ROCKING STONE, OF LOGAN, is a stone of a prodigious size, so nicely poised, that it rocks or shakes with the smallest force. Several of the consecrated stones mentioned above, were rocking stones; and there was a wonderful monument of this kind near Penzance in Cornwall, which still retains the name of main-amber, or the sacred stones. With these stones the ancients were not unacquainted.

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Pliny relates that at Harpasa, a town of Asia, there was a rock of such a wonderful nature, that, if touched with the finger, it would shake, but could not be moved from its place with the whole force of the body. Ptolemy Hephistion mentions a stone of this description near the Ocean, which was agitated when struck by the stalk of the plant asphodel, or day lily, but could not be removed by a great exertion of force. Another is cited by Apollonius Rhodius, supposed to have been raised in the time of the Argonauts, in the island Tenos, as the monument of the two-winged sons of Boreas, slain by Hercules; and there are others in

China, and in other countries.

Many rocking stones are to be found in different parts of Great Britain; some natural, and others artificial, or placed in their position by human art. That the latter are monuments erected by the Druids cannot be doubted; but tradition has not handed down the precise purpose for which they were intended. In the parish of St. Leven, Cornwall, there is a promontory called Castle Treryn. On the western side of the middle group, near the top, lies a very large stone. so evenly poised, that a hand may move it from one side to the other; yet so fixed on its base, that not any lever, or other mechanical force, can remove it from its present situation. It is called the LOGAN-STONE, and is at such a height from the ground as to render it incredible that it was raised to its present position by art. There are, however, other rocking stones, so shaped and situated, that there cannot be any doubt of their having been erected by human strength. Of this kind the great QUOIT, OF KARN-LE HAU, in the parish of Tywidnek, in Wales, is considered. It is 39 feet in circumference, and four feet thick at a medium, and stands on a single pedestal. In the Island of St. Agnes, Scilly, is a remarkable stone of the same kind. The under rock is 104 feet high, 47 feet round the middle, and touches the ground with not more than half its base. The upper rock rests on one point only, and is so nicely balanced, that two or three men with a pole can move it. It is 84 feet high, and 47 in circumference. On the top is a bason hollowed out, 3 feet 11 inches in diameter at a medium, but wider at the brim. and 3 feet in depth. From the globular shape of the upper stone, it is highly probable that it was rounded by human art, and perhaps even placed on its pedestal by human

strength. In Sithney parish, near Helston, in Corawall, stood the famous logan, or rocking stone, commonly called Men Amber, that is, Men an Bar, or the top stone. It was 11 feet by 6, and 4 high, and so nicely poised on another stone, that a little child could move it. It was much visited by travellers; but Shrubsall, the Governor of Pendenuis Castle, under Cromwell, caused it to be undermined, by the dint of much labour, to the great grief of the country. There are some marks of the tool on it; and it seems probable, by its triangular shape, that it was dedicated to Mercury.

THE chief ecclesissical ornament of London is the Cathedral Church of St. Paul, which stands in the centre of the metropolis, on an eminence rising from the valley of the Fleet. The body of the church is in the form of a cross. Over the space where the lines of that figure intersect each other, rises a stately dome, from the top of which springs a lantern adorned with Corinthian columns, and surrounded at its base by a balcony; on the lantern rests a gilded ball, and on that a cross (gilt also) crowning the ornaments of the edifice. The length of the church, including the por-

tico, is 510 feet; the breadth 282; the height to the top of the cross 404; the exterior diameter of the dome 145; and the entire circumference of the building 2,292 feet. A dwarf stone wall, supporting a ballustrade of cast iron, surrounds the church, and separates a large area, which is properly the church-yard, from a spacious carriage and

ST. PAUL'S CATHEDRAL.

foot-way on the south side, and a foot pavement on the north.

The dimensions of this camedral are great, but the grandeur of the design, and the beauty and elegance of its proportions, more justly rank it among the noblest edifices of the modern world. It is adorned with three porticoes; one at the principal entrance, facing the west, and running parallel with the opening of Ludgate Street; and the other two facing the north and south, at the extremities of the eross aisle, and corresponding in their architecture. The western portico combines as much grace and magnificence as any specimen of the kind in the world. It consists of 12

lofty Corinthian columns below, and 8 composite above, supporting a grand pediment; the whole resting on an elevated base, the ascent to which is by a flight of twentytwo square steps of black marble, running the entire length of the portico. The portico at the northern entrance conaists of a dome, supported by six Corinthian columns, with an ascent of twelve circular steps, of black marble. southern portico is similar, except that the ascent consists of twenty-five steps, the ground on that side being lower.

The great dome is ornamented with thirty-two columns below, and a range of pilasters above. At the eastern extremity of the church, is a circular projection, forming a recess within for the communion table. The walls are wrought in rustic, and strengthened and ornamented by two rows of coupled pilasters, one above the other, the lower being Corinthian, and the other composite. northern and southern sides have an air of uncommon elegance. The corners of the western front are crowned with turrets of an airy and light form.

To relieve the heavy stile of the interior, statues and monuments have been erected to the memory of great men. The statues are plain full-length figures, standing on marble pedestals, with appropriate inscriptions, in honeur of Doctor Samuel Johnson, the benevolent Howard, and Sir William Jones, of Asiatic celebrity. Several of the monuments would disgrace the most barbarous age, and ought to be removed. The tomb of the great Nelson is beneath

the pavement immediately under the dome.

The two turrets on the right and lest of the west front are each two hundred and eight feet in height. In one on the southern side is the great clock, the bell of which, weighing 11,474 pounds, and 10 feet in diameter, may be heard in the most distant part of London, when the wind blows towards that quarter. The entire pavement, up to the altar, is of marble, chiefly consisting of square slabs, alternately black and white, and is very justly admired. The floor round the communion table is of the same kind of marble, mingled with porphyry. The communion table has no other beauty; for, though it is ornamented with four fluted pilasters, which are very noble in their form, they are merely painted and veined with gold, in imitation of lapis lazuli. Eight Corinthian columns of blue and



No. 80 .- St. Paul's Church.



No. 81 .- Westminster Abbey.

white marble, of exquisite beauty, support the organ gallery. The stalls in the choir are beautifully carved, and the

other ornaments are of equal workmanship.

This Cathedral was built at the national expence, and cost £736,752. The iron ballustrade on the wall surrounding the space that is properly the church-yard, which, with its seven iron gates, weigh 200 tons, cost £11,202. This immense edifice was reared in \$5 years, the first stone being laid on the 21st of June, 1675, and the building completed in 1710, exclusive of some of the decorations, which were not finished till 1723. The highest stone of the lantern was laid on by Mr. Christopher Wren, son of the architect, in 1710. It was built by one architect, Sir Christopher Wren, by one mason, Mr. Strong; and while one prelate, Dr. Henry Compton, filled the see of London.

The dimensions of St. Paul's, from east to west, within the walls, are 510 feet; from north to south, within the doors of the porticoes, 282; the breadth of the west entrance, 100; its circuit, 2292; its height within, from the centre of the floor to the cross, 340 feet. The circumference of the dome is 430 feet; the diameter of the ball, 6; from the ball to the top of the cross, 30; and the diameter of the columns of the porticoes, 4 feet. The height to the top of the west pediment, under the figure of St. Paul, is 120 feet; and that of the tower of the west front, 287.

From the bottom of the whispering gallery are 280 steps; including those to the golden gallery, 534, and to the ball, in all, 616 steps.—The weight of the ball is 5600 pounds.—The weight of the cross is 3360.—The extent of the ground whereon this Cathedral stands, is two acres, 16 perches. The length of the hour figures 2 feet 24 inch-

es; the circumserence of the dial is 57 seet.

The Whispering Gallery is a very great curiosity.—It is 140 yards in circumference. A stone seat runs round the gallery along the foot of the wall. On the side directly opposite the door by which the visitor enters, several yards of the seat are covered with matting, on which the visitor being seated, the man who shews the gallery whispers, with the mouth close to the wall, near the door, at the distance of 140 feet from the visitor, who hears his words in a loud voice, seemingly at his ear. The mere shutting of the door produces a sound to those on the opposite seat like violent

claps of thunder. The effect is not so perfect if the visitor sits down half way between the door and the matted seat, and still less so if he stands near the man who speaks, but

on the other side of the door.

The marble pavement of the church is extremely beautiful, seen from this gallery. The paintings on the inner side of the dome, by Sir James Thornhill, are viewed with most advantage here. The ascent to the Ball is attended with some difficulty, and is encountered by few, yet both the Ball and passage to it well deserve the labour. The diameter of the interior of the Ball is six feet two inches, and twelve persons may sit within it.

The prospect from every part of the ascent to the top of St. Paul's, wherever an opening presents itself, is extremely curious. The effect is most complete from the gallery surrounding the foot of the lantern. The metropolis, from that spot, has a mimic appearance, like the objects in a fantoccino. The streets, the pavements, the carriages, and foot-passengers, have the appearance of fairy ground and fairy objects. The spectator, contemplating the bustle of the diminutive throng below, is moved a little out of the sphere of his usual sympathy with them; and, as if they were emmets, asks himself involuntarily "about what are those little, inconsequential animals engaged?"

The form of the metropolis, and the adjacent country, is most perfectly seen from the gallery at the foot of the lantern, on a bright summer day. The ascent to this gallery is by 534 steps, of which 260, nearest the bottom, are extremely easy; those above difficult, and in some parts dark and unpleasant. In the ascent to this gallery may be seen the brick cone that supports the lantern, with its ball and cross; the outer dome being turned on the outside of the cone, and the inner dome turned on the inside. entire contrivance to produce the effect within the church. and on the outside, intended by the architect, is extremely fine, even marvellous. From the pavement of the church, the interior appears one uninterrupted dome to the upper extremity; but it consists, in fact, of two parts, the lower and principal dome having a large circular aperture at its top, through which is seen a small dome, that appears part of the great and lower dome, although entirely separated

from it, being turned also within the cone, but considerably above it.

WESTMINSTER ABBEY.

[See Plate, No. 81.]

Trus interesting edifice derives its name of Westminster Abbey from its situation in the western part of the metropolis, and its original destination as the church of a monastery. The present church was built by Henry III. and his successors, with the exception of the two towers at the western entrance, which are the work of Sir Christopher Wren. The length of the church is 360 feet; the breadth of the nave 72 feet; and the cross aisle 195 feet. roof of the nave and of the cross aisle is supported by two rows of arches, one above the other, each of the pillars of which is a union of one ponderous round pillar, and four of similar form, but extremely slender. These aisles being extremely lofty, and one of the small pillars continued throughout, from the base to the roof, produce an effect uncommonly grand and awful. The choir is one of the most beautiful in Europe. It is divided from the western part of the great aisle by a pair of noble iron gates, and terminates at the east by an elegant altar of white marble. The altar is enclosed with a very fine ballustrade, and in the centre of its floor is a large square of curious mosaic work, of porphyry, and other stones of various colours. In this choir, near the altar, is performed the ceremony of crowning the kings and queens of England.

At the southern extremity of the cross aisle are erected monuments to the memory of several of our most eminent poets. This interesting soot is called *Poet's Corner*; and never could place be named with more propriety; for here are to be found the names of Chaucer, Spencer, Shakspeare, Ben Jonson, Milton, Dryden, Butler, Thomson, Gay, Goldsmith, Addison, Johnson, &c.—Here also, as if this spot was dedicated to genius of the highest rank, are

the tombs of Handal, Chambers, and Garrick.

The curiosities of Westminster Abbey consist chiefly of its highly-interesting chapels, at the eastern end of the church, with their tombs. Immediately behind the altar stands a chapel dedicated to Edward the Confessor, upon an elevated floor, to which there is a flight of steps on the

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northern side. The shrine of the Confessor, which stands in the centre, was erected by Henry III. and was curiously ornamented with mosaic work of coloured stones, which have been picked away in every part within reach. Within the shrine is a chest, containing the ashes of the Confessor. The frieze representing his history from his birth to his death, put up in the time of Henry III. is highly curious, and deserves the study and attention of every lover of autiquity. The tomb of Henry III. is in this chapel; it has been extremely splendid, but is now mutilated. The table on which lies the king's effigy in brass is supported by four twisted pillars, enamelied with gilt. This tomb, which is a fine specimen of its kind, is almost entire on the side next the area. It likewise contains the tembs of Edward I. and his Queen Eleanor; of Edward III. and Queen Philippa; of Richard II. and his Queen; of Margaret, daughter of King Edward IV.; of King Henry V.; and of Eliz-· abeth, daughter of King Henry VII.

The grand monument of Henry V. is inclosed by an iron gate. The great arch over the tomb is full of ribs and pannels, and the headless figure of Henry still remains; the head was of solid silver, and was stolen during the civil wars. There was a chantry directly over the tomb, which had an altar-piece of fine carved work. The armour of Henry once hung round this chantry; his helmet yet remains on the bar, and the very saddle which he rode at the battle of Agincourt, stripped of every thing which composed it, except the wood and iron, hangs on the right.

Contigious to the eastern extremity of the church, and opening into it, stands the famous chapel of Henry VII. dedicated to the Virgin Mary, one of the finest and most highly-finished pieces of Gothie architecture in the world. On its site formerly stood a chapel, dedicated to the Virgin Mary, and also a tavern, distinguished by the sign of the White Rose. Henry, resolving to erect a superb mausoleum for himself and his family, pulled down the old chapel and tavern; and on the 11th of February, 1503, the first stone of the present edifice was laid by Abbot Islip, at the command of the King. It cost £14,000., a prodigious sum for that period, (equal to £280,000. of our money;) and still more so, considering the parsimonious temper of the King. The labour merely of working the

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have been whelped in the Tower are more fierce than such as have been taken wild. The dens are inclosed in front by iron gratings: the greater part of them have been recently rebuilt, and every precaution taken to prevent accidents,

The Spanish Armory contains the trophies of the famous victory of Queen Elizabeth over the Spanish Armada. Among these the most remarkable are the thumb-screws, intended to be used to extort confession from the English where their money was hidden. In the same room are other curiosities; among which is the axe with which the unfortunaxe Anne Bullen was beheaded, to gratify the capricious passions of her husband, Henry VIII. A representation of Queen Elizabeth in armour, standing by a cream-coloured horse, attended by a page, is also shewn in this room. Her Majesty is dressed in the armour she wore at the time she addressed her brave army, in the camp of Tilbury, 1588, with a white silk petticoat, ornamented with pearls and spangles.

The SMALL Armory is one of the finest rooms of its kind in Europe. It is 345 feet in length, and in general it contains complete stands of arms for no less than 100,000 men. They are disposed in a variety of figures, in a very elegant manner. A piece of ordnance from Egypt has been lately added, sixteen feet long, and seven inches and a half bore. There are several other curiosities, among which are arms taken at various periods from rebels; the lighland broad-sword deserves particular notice. In many respects this room may be considered as one of the won-

ders of the modern world.

The Volunteer Armory is in the White Tower, and contains arens, piled in beautiful order, for 30,000 men, with pikes, swords, &c. in immense numbers, arranged in stars and other devices. At the entrance of this room statels a fine figure of Charles Brandon, Duke of Suffolk, in bright armour, and having the very lance he used in his life-time, which is eighteen feet long.—The Sea Armory is also in this Tower, and contains arms for nearly 50,000 sailors and marines. In this room are two elegant pieces of brass cannon, presented by the City of London to the Emil of Leicester, and various similar curiosities.

Part of the ROYAL TRAIN OF ABTILLERY is kept of the ground floor, un or the small armory. The room is

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In make it is the model of the square White Tower, and is of excellent workmanship. At the coronation it is who ced on the king's table. -7. The sword of Mercu. It has no point .- 8. A grand silver font, used for christenings of the royal family.—9. The crown of state, which is worn by the king at his meeting of the parliament, and other state occasions. It is of extreme splendour and value, being covered with large-sized precious stones, and on the top of its cross is a pearl which Charles I. pledged to the Dutch Republic for eighteen thousand pounds. Under the cross is an emerald diamond of a pale green colour, seven inches and a half in circumference, and valued at tose hundred thousand pounds; and in the front is a rook ruby, unspalished, in its purely natural state, three inches long, and the value of which cannot be estimated -10. The golden eagle, with which the king is anointed, and the golden specimen 11. The diadem, worn by the Queens Anne and Mary.-And, 12. The crown of Queen Mary, the cross of King "William, and several other valuable jowels.

In this Office are all the crown jewels worn by the princes and princesses at coronations, and abandance of custous old plate. Independently of several of the jewels which are mestimable, the value of the precious atomes and plate contained in this office, is not less than two millions sterling.

The CHAPPL, situated at the north-end of the parade, is not otherwise attractive than as it contains a few ancient tombs and monuments.

THE BANK OF ENGLAND.

THE building thus entitled is an immense and very extensive stone edifice, situated a little to the north-west of Cornhill. The front is composed of a centre, eighty fact in length, of the Ionic order, on a rustic base; and of two wings, ornamented with a colomade. The back of the building in Lothbury, is a high and heavy wall of stone, with a gate way for carriages into the bullion court.

On the east-side of the principal entrance from Threadacedlisstreet, is a passage leading to a spacious apartment tailed THE ROTTEDA, in which business in the public funds is transacted; and, brenching out of this apartment, are various offices appropriated to the management of each particular stock. In each of these, under the several letters as the alphabet, we assumed the books, in which we assume of every artividant's marked in each a fand is registered. The hull for the vano and archaes of tradported to public room, enverty supplested by buty, and contains a very time marked assume at King William III., the topology of the bank, on admired piece of endagens.

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lations of finance and convenience existing under any government. It has gradually been brought to its present perfection, being at first in the hands of individuals, and replete with abuses. In its present form it not only supplies the government with a great revenue, but accomplishes that by means highly beneficial to the persons contributing.

The Post-office is the most important spot on the surface of the globe. It receives information from all countries; it distributes instructions to the antipodes; it connects together more numerous and distant interests of men than any similar establishment. It is, in the highest degree intherto realized, the seat of terrestrial perception and

volition,—the brain of the whole earth!

The mode of carrying letters by the general-post was greatly improved a few years since, by a most admirable plan, invented by Mr. Palmer. Previously to its adoption, letters were conveyed by carts, without protection from robbery, and subject to delays. At present they are carried, according to Mr. Palmer's plan, by coaches, distinguished by the name of MAIL-COACHES, provided with a well-armed guard, and forwarded at the rate of eight miles un hour, including stoppages. Government contracts with coach-keepers merely for carrying the mail, the coachowner making a profitable business besides, of carrying passengers and parcels. It is not easy to imagine a combination of different interests to one purpose, more complete than this. The wretched situation, however, of the horses, on account of the length of the stages which they are frequently driven, is a disgrace to the character of the British nation, and requires the interference of the legisla-No stage should exceed twelve miles in length. The rapidity of this mode of conveyance is unequalled in any country.

THE MONUMENT.

About two hundred yards north of London-bridge, is situated one of the finest pillars in the world, erected by Sir Christopher Wiren, in memory of the great fire, which, in 1600, proke out at a house on this spot, and destroyed the astropolis from the Tower to Temple Bar. It is a duted column of the Doric order; its total height is 202

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It would be impossible adequately to describe the first impressions made on the spectator on his entrance into ras. GALLERY, where such a galaxy of genius and art was offered to his contemplation. It was lined by the finest pro-: ductions of the French, Flemish, and Italian schools, and divided by a curious double painting upon slate, placed ona pedestal in the middle of the room, representing the frontand back views of the same figures.

From the Museum the visitor descends into THE SALLE DES ANTIQUES, containing the finest treasures of Grecian. and Roman statuary. His notice is instantly attracted by THE BELVIDERS APOLLO, a statue surpassing, in the opinion of connoisseurs, all the others in the collection. This: matchless statue is thus described by Sir John Carr, in hiswork entitled The Stranger in France. "All the divinityof a god beams through this unrivalled perfection of form. It is impossible to impart the impressions which it inspires: the rivetted beholder is ready to exclaim with Adam, when he first discerns the approach of Raphael:

-Behold what glorious shape

Comes this way moving: seems another more Liven on microcon; some great behost from fraven."

"The imagination tannot form shell magination of grace and strength. One of its many transcendant beauties consist in i.s aerial appearance and exquisite expression of merion."

THE MEDICEAN VENUS, from the Palace Pitti, at Florence, also formed a part of this magnificent collection of statues. The classic Addison, in speaking of this statue, which he saw at Florence, observes, that it appeared to him much less than life, in consequence of its being in the company of others of a larger size; but that it is, notwithstanding, as large as the ordinary size of women, as he concluded from the measure of the wrist; since, in a figure of such nice proportions, from the size of any one part it is easy to guess at that of the others. The fine polish of the martle, communicating to the touch a sensation of deshy softness, the delicacy of the shape, air, and posture, and the correctness of design, in this celebrated storue, are not to be expressed.

THE Paris Michelly and Salle DES Astroces, al-

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thousand pounds to his executors, and purchase a house sufficiently commodious for it. The parliament acted with great liberality on this occasion; several other valuable collections were united to this of Sir Hans Sloane, and the whole establishment completed for the sum of eighty-five thousand pounds, which was raised by the way of lottery. Parliament afterwards added, at various times, to the Slonean Museum, the Cottonian Library; that of Major Edwards; the Harleian Collection of Manuscripts; Sir William Hamilton's invaluable collection of Greek Vases; the Townleian collection of Antique Marbles; the Manuscripts of the late Marquis of Lausdown; and, lastly, the celebrated Elgin Marbles, which comprise what are considered as the finest specimens of ancient sculpture.

The whole of the important library of printed books and manuscripts which had been gradually collected by the Kings of England from Henry VIII. to William III. was presented to the Museum by George II.; and George III. bestowed on it a numerous collection of valuable pamphlets, which had been published in the interval between 1640 and 1660. His Majesty likewise contributed the two finest mummies in Europe; the sum of £1,123. arising from lottery prizes, which had belonged to his royal predecessor; and, in 1772, a complete set of the Journals of the Lords and Commons. To these contributions His Majesty has since added a collection of natural and artificial curiosities, sent to him, in 1796, by Mr. Menzies, from the North-West coast of America, and several single books of great value and utility.

The trustees have lately added Greenwood's collection of stuffed birds; Hatchet's minerals; Halhed's oriental manuscripts; Tyssen's collection of Saxon coins; Doctor Bentley's classics; and the Greville collection of minerals. To these may be added numerous donations from several of the Sovereigns of Europe, as well as from learned bod-

ics, and private individuals.

On entering the gate of the Museum, a spacious quadrangle presents itself, with an Ionic colonnade on the south side, and on the north, the main building, which measures 216 feet in length, and 57 in height, to the top of the cornice. Several additional buildings have lately been added for the above collections.

For recent from country of the bosons, and converge the filteres of prince thanks. The decorations of the discretion of the decoration. The redling, which represents Photon periodistry Apadla by provident in deriving the form of the less seems to the form of the less relative to the freedom of the less relative of the freedom of the fitting and the fitting of the fitting of the fitting and the fitting of the fitting o

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The seventh is appropriated to the Royal and Cottonian library of manuscripts. On a table, in a glazed frame, is the original of the Magna Charta, belonging to the Cottonian library. Against the press, No 21, of the Cottonian collection, is the original of the Articles preparatory to the signing of the Great Charter, perfect, with the seal.

The magnificent saloon is filled with the Greville collection of minerals, the finest in the world, admirably arranged, and luminously coloured. The dome of this saloon merits notice. It was painted by La Fosse, and has been described as the apotheosis of Iris, or birth of Minerva.—In the middle of the window stands a table, composed of a variety of lavas from Mount Vesuvius presented by the

Earl of Exeter.

The eighth room contains a department of natural history, part of which is the valuable donation of Mr. Cracherode, disposed in two tables, nearly in the Linnæan order; and a much more extensive series, arranged according to the Wernerian system. The principal productions are very valuable, consisting of minerals from Derbyshire, Siberia, the South Seas, volcanic and rock stones from Germany. One very curious specimen of natural history is pointed out in the fifth division of the Cracherodean collection, an egg-shaped piece of calcedony, containing water. (enhydros,) which may be seen by gently shaking the vase. Here also, in a glass-case, is the famous fossil skeleton from Gaudaloupe, which has been the object of much interesting controversy among eminent naturalists in the Monthly Magazine. The ninth is appropriated to petrifactions and In the first division of the cases in the middle of the room is a valuable univalve shell, of the species called the paper nautilus, or argonaut shells, remarkable for the slightness of its fabric, and the elegance of its shape. It is inhabited by an animal not unlike a cuttle-fish, which by extending a pair of membranes, adhering to the top of its longest arms, has the power of sailing on the surface of the sea. Under the tables are deposited, in this and the next room, a great number of volumes and parcels, containing collections of dried plants; which, from the fragile nature of their contents, are shewn only on particular leave. tenth room is entirely filled with vegetable productions. Moophites, sponges, &c. The contents of the eleventh

room are birds, and arranged, as far as convenience would admit, according to the Linnsean system. Among the curious specimens of ornithology is a humming-bird, scarcely larger than a bee; and another beautiful little creature called the harlequin humming-bird, from the variety of its colours. In this room there is a curious picture, executed mamy years ago in Holland, of that extremely rare and curious bird, the dodo, belonging to the tribe gallinæ. ble in the middle are preserved the nests of several birds. among the most curious of which are several hanging nests, chiefly formed by birds of the oriole tribe; nests of a substance resembling isinglass, which the Chinese make into a rich soup; scarce feathers, &c. In the second table are deposited a variety of eggs and nests: among the former may be noticed the eggs of the ostrich, the cassowary, the crocodile, &c. In the cases between the windows are several of the rarer quadrupeds; among these the most curious are, two ourang-outangs, in a young state, a long-tailed macauci, ermine, &c; in cases under the tables are an armadillo, or porcupine, several young sloths, and a fine specimen of the two-toed ant-eater. The twelfth room contains a general and extensive arrangement of fishes, serpents, lizards, frogs, &c.

THE TOWNLEY MARBLES and EGYPTIAN ANTIQUITIES, are deposited in a very elegant suite of rooms built purposely for them. The first room is devoted to a collection of bass-reliefs, in terra cotta, pronounced the finest in Europe. The second is a beautiful circular room, whence you have a fine view of the whole suite of apartments, bounded at the end by an exquisitely-wrought discobolon, or ancient quoitplayer. This room is devoted to Greek and Roman sculptures, among which may be pointed out a fine candelabrum, with several beautiful busts and statues. The third and fourth rooms are also filled with Greek and Roman sculptures: in the latter are several fine bass-reliefs. The fifth contains a collection of Roman sepulchral monuments, and a beautiful mosaic pavement, recently discovered in digging the foundations for the new building at the bank of England. The sixth exhibits a miscellaneous collection of one bundred grand pieces of Roman and Greek sculpture. The seventh is devoted to Roman antiquities; and the eighth, on the left, to Egyptian antiquities, among which are the two

mummies before mentioned, with their cossins; a manuscript, or papyrus, taken from a mummy, &c. Among the Egyptian sculptures in the ninth room, is the celebrated sarcophagus, commonly called the tomb of Alexander the Great, —[See Plate, No. 73.]—an engraving and dissertation on which appeared in the Monthly Magazine for February, 1809. The tenth contains Greek and Roman sculptures of singular beauty.

Thence returning, and proceeding up stairs, the visitor is conducted to the eleventh room, containing ancient and modern coins and medals, arranged in geographical order. those of each country being kept separate. It is not shown unless by the permission of the trustees, or of the principal librarian. Not more than two persons are admitted at one time, without the presence of the principal librarian, or of some other officer. The twelfth room contains the collection of the late Sir William Hamilton, which has been removed from the saloon. It principally consists of penates, or household goods, bronze vessels, utensils, &c. specimens of ancient glass, necklaces, bullæ, fragments of relievos, and ancient armour, tripods, knives, patent lamps, seals, weights, sculpture in ivory, bracelets, bits, spurs, ancient paintings from Herculaneum, Babylonish bricks, and his unrivalled collection of Greek vases, the greater part of which were found in the sepulchres of Magna Grecia. The forms of the vases are much varied, and are equally simple and beautiful. In the thirteenth is deposited the extensive and valuable collection of prints and drawings, the most important part of which was bequeathed by the Rev. William Cracherode. The contents of this room can be seen only by a few persons at a time, by particular permission.

THE LINWOOD GALLERY, LEICESTER-SQUARE.

In viewing the beautiful specimens of female ingenuity displayed in this gallery, the mind naturally reverts to the best days of the Gobelin tapestry; and it is not paying any compliment to Miss Linwood to say, that as works of art, for truth and fidelity of colouring, expression and outline, they need not shun a comparison with the finest of the French performances. Considering them in another point of view. As productions of the NEEDLE, they are the most wonderful performances on record, and have opened

a new and heautiful road for the annument of our irreduced every rook. Two much preme cannot, therefore, he becaused on this tally for her laventem or a new order of picturing "A Michael's grandent and a Randon!'s proce."

The religition consists of about accounts esquisic copies. in needle-work, of the finest pictures of the Eurlish and Foreign schools, proceeding all the correct drawing, limit arlearning, light and shade, of the original pictures town which they are taken, and to which in point of effect, they are in in degree intinting. On entering the dear troop I ob spage square, the writter is those two the principal range, a tipe adher of openhene proportions, lane with apple lands clark, weld hellion town in, and treach tembers. On our and of this cours the protuces are hone, and have a great to front to love the company of the responde distance, and for processing them. In the page and similars are some and restores, to qualify the homeous out the count, for the assessment implement of the business and it the opportunity automital and ampleting of eating and either the form to the left through the sline tear the enough in his count obscure your save permanently and hadrin the cell of a prace, on tordities have which is were the locaritud bonds from the syvisited by the ablest and larger of the man, the in to be the log consistent. The sames the equipment the whole a must be unused. A little further on the ordinary, they assessed of who it were a and the hards of the share to be -1. at hadring to at sitting, is many a firm and regardent income. rings of broughteness only a north gar a lightfeite, at annings to the they will a tropp popular of the total distribution by We get the of as I being does with a wood or on, a grilling of me of the map chigh abettary and a from bather to a specifical Various, He said that he rates of the sign the seconds. rate, the stages made a rant oil to one which is emported distance man angle photon. County the an ite - rounge red beand and rame, alm Cash that I am dender, the more valuable some in the core section in a surmer, and pendant, at the votage to a sure most as the

of the second of

There is a first the property of the control of the

ferent objects, including quadrupeds, birds, reptiles, insects, ancient arms, works of art, &c. arranged in scientific order.

The South SEA CURIOSITIES were principally brought to England by Captain Cook, and consist of superb feathers, cloaks, helmets, bats of feathers, ornaments, breastplates, war-clubs, idols, fish-hooks, fly-flaps, caps, &c. To these are added, from other sources, war-clubs, paddles, bows, rattles, adzes and axes of hard black stone, knives, dresses, &c. Among the North and South American CURIOSITIES are maucasons, or shoes; a quiver with poisoned arrows, and a tube for discharging them; belts; pouches; a great variety of bows and arrows; snow shoes; the calumut, or pipe of peace; a wampum belt; a specimen of cloth, made of the asbestos, &c. brought from Canada, Hudson's Bay, and other parts of these territories. The class of African Curiosities contains musical instruments; sceptres; pouches; shoes; fans; bows; poisoned arrows; lances; daggers, &c. with hammocks; gourds; an African harp; a pair of bellows; and other curious objects.

The department of Works of Art, contains, among other objects of great value and beauty, a fine equestrian model of Edward the Black Prince, in armour; models in coloured wax; busts in rice paste; medals of ancient armory, of Chinese pagoda, and of men of war, in coloured straw; sculptures in ivory; pictures, in coloured sand, in wood, &c.

The department of NATURAL HISTORY contains several thousand species, and excels any in Great Britain, either for the rarity and number of the specimens, or the beautiful and novel manner in which they are displayed. Among the quadrupeds are all the interesting specimens, from the huge elephant and the rhinoceros to the most minute species. The giroffe, or camelopardalis, seventeen foet three inches high, is the finest in Europe. Among the birds, are beautiful specimens of the bird of Paradise; that magnificent bird the grand hoopoe; humming birds; a black swan; an undescribed water-bird, of the duck tribe, &c. &c. all beautifully stuffed. Among the amphibious animals is the great boa, thirty-two feet in length; the American and African iguana scrpents; rattlesnakes; spectacle snakes; a fine specimen of the geometrical tortoise, &co. The Ichyelogical, Entomological, and Mineralogical departments are equally rich; as is likewise that of the marine productions.

the miscellanuous articles are amoustons, and shiftfly so-

The Activey of the Moseum is litted up to an appenpriate and elegant manage, improveding the mission of the half of one of the costles of our ancient redshifty; the acmost and various materimizate of war are displayed in terphics, or on hence, placed make gathic concess.

Neither pains nor expense have been spaced by Mr. Bultack to carried his museum. The traveling correspond Benaparte,—the economy of space in which is like that of the colls of a becahive,—and prechanged by him of Level Bethares for stupe gainers. It was estimated that, up to the mouth of June, 1517, either at the mouthers, or in overall grant fowns of the coupies, where it has been conditioned and less than four hundred thousand parameter but entered this very interesting which. To this he has added a current and excite assemblings of impostal teless from the parameter of Napackon the trival; two aplended master parameter, recently loand on the flows of the boths of Narameters of the technology of the both of Carry, its played to the figures of Flabo and Tespackory, as admits by sculptured, that they each on the frequency, the

BOUTER BARROURL'S HARRY PRESCOPE.

1500 Plate, No. 25 1

I'm lead to a stearer comprehension of the manager in which the belong pas of the Horschol are constructed, it is non owner to where to those of females and for your, Inc farmer of the or compute of a table, towards the and of which a compre mirror to place ! The converging race, be conthey much the fictus, are made to fall on a plane encin-Mornel of an emple of large live deporter, and there in mount the forms of a conservations, Dand to the major to be the colessen in through which the eye had a day one it was a The laster commission a tube, on which a come is minute, lifting a liabour to course, is placed. An parallel for. treat un object falling ou this informe, will, over tell- than form on inversed image of its famile. This time is formyor, is imprometed by a mader more, which referrs to Such an an eye glass in the lade of the large on rue, the man which the observer sizes the support

In the Ichescopes made by Un Brucchil, the above to

reflected by a mirror, as in the Gregorian telescope, and the rays are intercepted by a lens at a proper distance, so that the observer has his back to the object, and looks through the lens at the mirror. The magnifying power is the same as in the Newtonian telescope; but there not being any second reflector, the brightness of the object viewed in the Herschel telescope is greater than that in the

Newtonian telescope.

The tube of Doctor Herschel's grand telescope is 39 feet 4 inches in length, and 4 feet 10 inches in diameter, every part being made of iron. The concave polished surface of the great mirror is 4 feet in diameter, its thickness 3½ inches, and its weight upwards of 2000lbs. This noble instrument was, in all its parts, constructed under the sole direction of Doctor Herschel: it was begun in the year 1785, and completed August 28th, 1789, on which day was discovered the sixth satellite of Saturn. It magnifies six thousand times.

Illustration of the cut. A B C is a ray of light, reflected by the great speculum B to the eye-glass. C D is a chair for the observer. E, a moveable gallery for spectators. F G, a smooth base for the frame to turn on. H and I. pullies to move the instrument. K are rooms for assistants.

THE ENGLISH TELEGRAPH.

[See Plate, No. 33.]

Between London and Portsmouth there are 12 stations; and thirty-one between London and Plymouth, of which eight are part of the Portsmouth line fill they separate in the New Forest. Another chain, extending from London to Varmouth, contains nineteen stations; and another from London to Deal, ten stations; making in the whole system sixty-four telegraphs. The distances average about eight miles, yet some of them extend to twelve or fourteen; and the lines are often increased by circuits, for want of commanding heights. In the Yarmouth line particularly, the chain makes a considerable detour to the northward.

After about twenty years' experience, they calculate on about two hundred days on which signals can be transmitted throughout the day; about sixty others on which they can pass only part of the day, or at particular stations; and about one hundred days in which few of the stations are



souther to the eithers. The practice of the statems in this trained no exceedingly vortion. The scatter on Public Health, communicating with Chylana, is generally in closel. anches during anatogly white by the constant in Lames or who is tille the called at the Trained between this age o cut Cholena lamental; or more community between the charge. gratance of the Administry and Thebes, Board Date are want to be mayorably uppersonable; and wearally doflows por no less mays. In the propertion of the wilds in will and full building across a valley, in several willing see anially ideas found water animes are finance to person to ower district days than land in any attentions. The peand long he woulde id the same day to an hoor in territor nor and alter the mark passage of the mandrag, party to thely on deat levels, where the plus of the end's tax- of Mary bany ox hal attende to the Hilland's man, agree stroots offer state. The transporter of the mention and executed the

A general monet indicate l'extension, son a de praire military or allower tributes techniques there by the entire of level on real and level to diane or reason with the horse to Physical breaking to an in the same as a constant of the the following many is a least have bounded outer. To this metanic, large on a mer had been given to make position of a view outputing over more professions over midconstraints beinder Thorpinger and other sale is seen humbed up with marth to some of the form of the groups, in the common process of a consult of my man to such an prosentation of so listing, out to in the trace of her if on the property of proper content to the more and be because to be minimum as their posts sent was to data they be when as to pre-months one directly the letter of the definition of many word and all the numbers with he do livery in a property water the I turn of the shifts. The court of more art rates and range in approximate the contract of the property of the contract of the

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are Dolland's Achromatics, which possess no recommendation but their enlarged field, and their freedom from prismatic colours in that field; points of no consequence in looking through a fixed glass at a fixed and circumscribed object. The field of the Galilean telescope is quite large enough, and having, instead of the six contained in Dollond's achromatics, but two lenses, one of which is a thin concave, it exhibits the object with greater brightness, and therefore ought to have been preferred for this purpose. It seems strange also, that, to ease the operator, it has never been contrived to exhibit the fixed spectrum, on the principle of a portable camera, so that, without wearying the eye, the changes of the distant telegraph might have been exhibited on a plane surface, and seen with both eyes-

THE AIR BALLOON.

[See Plate, No. 82.]

Among the many discoveries of modern philosophythis is one of the most splendid: hitherto, however, it has not been attended by corresponding utility, owing to the difficulty of glacking the machine. The most promising attempts to overcome this difficulty were made by Zembeccari, an Italian, whose aerial excursions are cariously detailed by Kotzebue, in his travels, and whose principles were truly scientific; but still this great desideratum remains to be attained.

The discovery of hydrogen gas, which is 15 times lighter than atmospheric air, suggested the plan of filling with this gaseous substance a silken balloon, and of its ascent in the air, with an aeronaut appended to it, provided the whole should not exceed the weight of an equal bulk of atmospheric air. The process of filling the balloon is accomplished by mixing five parts of water with one of sulphuric acid, and pouring the mixture on iron filings: the light gas, by the decomposition of the water, will rise into the balloon; and the balloon, being 12 times lighter than the atmospheric air, will rise through it. Thus have two, three, and even four persons, been at one time carried through the atmosphere.

More than fifty aerial voyages, in different parts of Eu-10pe, have been made by Blanchard; nearly as many by

Garnerin; and thirty by Mr. Sadler.

THE STEAM ENGINE.

[See Plate, No. 83.]

This engine consists of a large cylinder or barrel, in which is fitted a solid piston like that of the forcing pump. Steam is thus supplied from a large boiler, which in forcing up the piston, instantly opens a valve, through which cold water rushes on the principle of the common pump. Other steam is then introduced, which forces it down again, and drives the water out of the pipe with immense force. The steam then raises the piston again, and again makes it fall by which alternate motion the grandest operations are performed. The action of the piston moves up and down a large beam; and this beam communicates to other ma-

chinery the power of 100 or 200 horses.

The power of some of the steam engines constructed by Messrs. Boulton and Watt, is thus described, as taken by actual experiment. An engine, having a cylinder of 31 inches in diameter, and making 17 double strokes per minute, performs the work of 40 horses, working night and day, (for which three relays, or 120 horses. must be kept) and buses 11,000 pounds of Staffordshire coal per day.-A cylinder of 19 inches, making 25 strokes of 4 feet each per minute, performs the work of 12 horses, constantly lalabouring, and burns 3,700 pounds of coals per day.-These engines will raise more than 20,000 cubic feet of water, 24 feet high, for every hundred weight of good pit coal consumed by them.

The principal of Watt's improved engine represented in the cut, is the same as the above, but the economy is still greater. The steam which is below the piston escapes into the condenser A, by the cock B, which is opened by the rod C, and at the same time the steam is admitted by the cock D into the upper part of the cylinder: when the piston has descended, the cocks E and F act in a similar manner in letting out the steam from above, and admitting it below the piston. The jet is supplied by the water of the cistern G, which is pumped up at H, from a reservoir: it is drawn out, together with the air which is extricated from it, by the air pump I, which throws it into the cistern K. whence the pump L raises it to the cistern M, and it enters

the boiler through a valve which opens whenever the float W descends below its proper place. The pipes O and P serve also to ascertain the quantity of water in the boiler. The piston rod is confined to a motion nearly rectilinear, by the frame Q. The fly-wheel R is turned by the sun and planet wheel S T, and the strap U turns the centrifugal regulator W, which governs the supply of steam by the valve or stop cock X.

STEAM BOATS.

[See Plate, No. 86.]

THE description of the Clyde steam boat, represented in the plate, is as follows. Its extreme length is 75 feet, its breadth 14, and the height of the cabins 64 feet. She is built very flat, and draws from 2 feet 9 inches to 3 feet water. The best or after-cabin, is 20 feet long, and is entered from the stern: between the after-cabin and the engine a space of 15 feet is allotted for goods. The engine is a 12 horse power, and occupies 15 feet: the fore-cabin is 16 feet long, and is entered from the side. The paddles 16 in number, form two wheels of 9 feet diameter, and 4 feet broad, made of hammered iron: they dip into the water from 1 foot 3 to 1 foot six inches. Along the outer edge of these wheels a platform and rail are formed quite round the vessel, projecting over the sides, and supported by timbers reaching down to the vessel's side. This steam boat runs at the rate of 4 or 44 miles per hour in calm weather; but against a considerable breeze 3 miles only. It can accommodate 250 passengers, and is wrought by five men. The engine consumes 12 cwt. of coals per day. nel of the boiler is 25 feet high; and carries a square sail 22 feet in breadth.

To convey a precise idea of the utility of steam boats, and to quiet the apprehensions entertained relative to their safety, the following details, by Sir Richard Phillips, have

appeared in the Monthly Magazine.

The groundless alarms relative to a supposed increase of danger from travelling by Steam-packets, led the editor of the Monthly Magazine, within the current month, (July, 1817) to make a voyage in one of them from London to Margate. This vessel left her moorings, at the Tower of London, about half past eight in the morning, at the time

the tide was cuming strong up the circu, and when an other want could make progress, everyn in the dissection of the lides. The above parket proveded, lowever, remove the seronm, in a gollant style, at the into of its to serve inthe an house, and a fraint of more, playing lively and on the is a combined with the dearliness of the motion, to reader the effect delightful. An exemination of the recenanyther, and of her enter of work log, proved that no possible billies of designs exhips. It appeared that the busies had been propert at them, then counds to the square mole; but thus the valve was field desire by a weight of only have possible, and that the interment gains all and tools are an employand that a bear almost used are also to wanter up bearing by the treatment some took. Honey it fullmen, that, although the oraque was capable of audinary a pro-correct at least tradity free country only four pointed, or has their a wirth, was the shids force which the valve would permit to be excited; and thus, in paint of thet, a pressure of only two paradiand a helf to the opine fuch, or only our leath of the proven power at the louise, some congles est. Dans in, therefore, less danger in passing amor home in contact with such a marking than there is in sitting much a final no topbettle, smeann, or consequent, make instanctance in which they are often und. Opposite throught a fine commendary to a efforded of the value of amore on a navi, and poures, to preservemento and thinks, a Merrate solute year has precing towards I contain which had be a a dec met and taptes on its possence, a perstant of amor which it as pears to out anomaion. In sheet, with montereprist pleasure, and in an bone mount then there appear had named at arareing, the recent was current about and Margar porc. has no employed mor hours to parterman a very polminety miles. In this case it appearent, that a presence of was presented to the equipment on to provide all atmost finds to the strate par among of the acting water wheels, and as these go at the feet or chamber, the motion of the orgaling stant, or a his figurities, mouth to in the vare of others. with an available obscuring at an average of the miles in home The communitation of comis diserve the region was the them a chalifold has it was disserbed to appropriate programmes to a chaldran and a half the the which, we have and the more demandered to the mouth and an every of

this mode of navigation; and there can be little doubtbut, in a few years, vessels of every size, and for every extent of voyage, will be provided with their steam-engine, which will be more used, and more depended upon, than winds or tides. The chances of accidents are lower than those under most other circumstances in which men are placed in travelling. By land, horses kill their thousands perannum, open chaises their hundreds, and stage-coaches their scores; and, by water, the uncertainty of winds has destroyed thousands, by prolonging the voyage, and increasing the expesure to bad weather; but in a steam-packet, navigated by an engine whose proven powers necessarily exceed what can 'be exerted during its use, or in general by such engines as those used on the Thames or Clyde, no accident can possibly happen-unless, by a miracle, it were to happen, that a force of four pounds should overcome a resistance of twenty-four pounds.

THE LIFE-BOAT.

The principle of this wonderful boat appears to have been suggested to the inventor, Mr. Greathead, by the following simple fact: that if a spheroid be divided into quarters, each quarter is elliptical, and nearly resembles the half of a wooden bowl, having a curvature with projecting ends; and that this quarter being thrown into the sea, or agitated water, caunot be upset, or be made to lie with the bottom upwards.

The length of the boat is thirty feet, and the breadth ten feet; the depth from the top of the gunwale to the lower part of the keel is three feet three inches; from the gunwale to the platform (within) two feet four inches; from the top of the stems (both ends being similar) to the horizontal line of the bottom of the keel five feet nine inches. The keel is a plank of three inches thick, of a proportionale breadth in midships, narrowing gradually towards the ends to the breadth of the stems at the bottom, and forming a great convexity downwards. The ends of the bottom section form that fine kind of entrance observable in the lower part of the bow of the fishing-boat called a coble, much used in the north. From this part to the top of the stem it is more elliptical, forming a considerable projection. The sides from the floorheads to the top of the gunwale flaunce

off on each side in proportion to above half the breadth of The breadth is continued far forwards towards the ends, leaving a sufficient length of straight side at the top. The sheer is regular along the straight side, and more elevated towards the ends; the gunwale fixed to the outside is three inches thick, and cased with layers of cork to the depth of sixteen inches downwards. The cork on the outside is secured with thin plates or slips of copper, and the boat is fastened with copper nails. The thwarts, or seats, are five in number, double banked, consequently the boat may be rowed with ten oars. The boat is steered with an oar at each end, and the steering-oar is one-third longer than the rowing-car. The platform, placed at the bottom within the boat, is horizontal, the length of the midships, and elevated at the ends for the convenience of the steersman, to give him a greater power with the oar. The internal part of the boat next the sides is cased with cork, the whole quantity of which affixed to the life-boat is nearly seven hundred weight. The cork contributes much to the buoyancy of the boat, and is a good defence in going along-side a vessel; but its principal use is in keeping the boat in an erect position in the sea; or, rather, for giving her a very lively and quick disposition to recover from any sudden cant or lurch, which she may receive from the stroke of a heavy wave.

The ends being similar, the boat can be rowed either way; and this peculiarity of form alleviates her in rising over the waves. The curvature of the keel and bottom facilitates her movement in turning, and contributes to the ease of the steerage, as a single stroke of the steering-oar has an immediate effect, the boat moving, as it were, upon a centre. The fine entrance below is of use in dividing the waves when rowing against them; and, combined with the convexity of the bottom, and the elliptical form of the stem, admits her to rise with wonderful buovancy in a high sea, and to launch forward with rapidity, without shipping any water, when a common boat would be in danger of be-The internal shallowness of the boat from the zunwale down to the platform, the convexity of the form, and the bulk of cork within, leave a very diminished space for the water to occupy; so that the life-boat, when filled with water, contains a considerable less quantity than the

common boat, and is in no danger either of sinking or overturning, whatever be the violence of the winds or waves.

The first of these boats went off on the 30th of January, 1790, and it has so well answered every expectation in the most tremendous seas, that, during the last twenty-five years, between four and five hundred lives have been saved at the entrance of the Tyne alone, which otherwise must have been lost, and in no instance has it ever failed. Of course, every ship and every port ought to be provided with its life-boat.

FIRST-RATE MAN OF WAR-

Or all the arts and professions which are calculated to attract a particular notice, no one appears more astonishing and marvellous than that of navigation, in the state in which it at presents exists. This cannot be made more evident, than by taking a retrospective view of the small craft to which navigation owes its origin, and comparing them to A MAJESTIC FIRST-RATE MAN OF WAR, containing one thousand men, with their provision, drink, furniture, apparel, and other necessaries, for many months, besides one hundred pieces of heavy ordnance, and bearing all this heavy apparatus safely to the most distant shores. A man in health consumes, in the space of twenty-four hours, about eight pounds of victuals and drink: consequently eight thousand pounds of provisions are daily requisite in such a ship. Let her be supposed, then, to be fitted out for three months. and it will be found, that she must be laden with 720,000 pounds of provisions. A large forty-two pounder, if made of brass, weighs about 6,100; and about 5,500, if of iron: and, in general, there are twenty-eight or thirty of these on the lower gun-deck, on board a ship of 100 guns; the weight of these, exclusive of that of their carriages, amounts to 183,000 pounds. On the middle gun-deck are thirty twenty-four-pounders, each weighing about 5,100 pounds. and, therefore, collectively, 153,000 pounds; and the weight of the twenty-six or twenty-eight twelve-pounders on the upper gun-deck, amounts to about 75,400 pounds; that of the fourteen six-pounders on the quartereleck, forecastle, and poop, to about 26,000 pounds; and, besides these, there are, in the round-tops, even three-pounders and swivels. If to this be added, that the com-

plete charge of a forty-two pounder weighs about sixtyfour pounds; and that at least 100 charges are required for each gun, this will be found to amount nearly to the same weight as the guns themselves. In addition also to this. the reflection must be made, that every ship must have, to provide against exigencies, at least another set of sails, cables, cordage, and tackling, which, taken together, amount to a considerable weight: the stores likewise consisting of planks, pitch, and tow; the chests belonging to the officers and seamen; the surgeon's stores; and various other articles requisite on a long voyage; with the small arms, bayonets, swords, and pistols, make no inconsiderable load. To this must be finally added, the weight of the crew; so that one of these first-rates carries, at the least, 2,162 tons burden, or 4,324,000 pounds; and, at the the same time, is steered and governed with as much ease as the smallest boat.

PRINTING ENGINE.

A NEW PRINTING PRESS, OF PRINTING ENGINE has recently excited the attention of the typographical world. It is wrought by the power of steam, and, with the aid of three boys, perfects nearly a thousand sheets per hour. A. common press, worked by two men, takes off but two hundred and fifty impressions on one side, and requires eight hours to perfect a thousand sheets. Hence, three boys in one hour are enabled, by this new application of the power of steam, to perform the labour of two men for eight Such are the present capabilities of this engine: but as there is no limit to its required powers, and the size of the form is no obstacle to its perfect performance, it is proposed to take impressions on double-demy, in which case three boys will, in one hour, perform the labour of thirty-two men. This engine is now at work at the printing-office of Bensley and Sons, near Fleet street, and another on a similar, but less perfect, construction, has for some time past been employed on a Morning Newspaper. In its general analogy, this press is not unlike the rollingpress of copper-plate printers. The forms being fixed on the carriage, are drawn under a cylinder, on which the sheet being laid, and the ink distributed by an arrangement of rollers, the impression is taken on one side. The sheet is then conveyed off by bands to a second cylinder, around

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which it is conveyed on the second form, and the reiteration is produced in perfect register, without the aid of points. All the manual labour is performed by a boy, who lays the sheet of paper on the first cylinder, by one who takes it off from the second cylinder, and by a third, who lays the sheets even on the bank. As a farther instance of economy in the materials, we may mention, that the waste steam from the copper is carried in tubes round the entire suite of offices, with a view to warm them.

GRAND GALVANIC BATTERY.

To comprehend more precisely the astonishing powers of this battery, prepared by Sir Humphrey Davy for the laboratory of the Royal Institution, it is necessary to premise, that the conductors of the galvanic fluid are divided into perfect and imperfect, the former consisting of metallic substances and charcoal, and the latter of water and oxydated fluids, as the acids and all the substances which contain these fluids. The simplest galvanic combinations must consist of three different conductors, not wholly of one class. When two of the three bodies are of the first class. the combination is said to be of the first order; when otherwise, it is said to be of the second. In simple galvanic circles it is indispensibly requisite that the conductors of one class shall have some chemical action on those of the other; for example: if a piece of zinc be laid on a piece of copper, and on the copper a piece of card or flannel, moistened with a solution of salt-water, a circle of the first class is formed; and if three other pieces be then laid on these in the same order, and repeated several times, the whole will form a pile, or battery, of the first order. When the three bodies which form a galvanic circle of the first order are laid on each other, the upper and the under ones not touching, these two extremes are in opposite electric states. The galvanic effects may be increased to any degree, by a repetition of the same simple galvanic combination; and these repeated combinations are called galvanic piles, or batteries, which may be constructed of various forms.

THE GRAND GALVANIC BATTERY, the most powerful combination existing, consists of two hundred separate troughs of Porcelain, connected together in regular order, each being composed of ten double plates, arranged in cells, and

tontaining in each plate 32 square inches; so that the whole number of double plates is 2000, and the whole surface 128,000 square inches. This battery, when the cells are filled with sixty parts of water, mixed with one part of nitric acid, and one part of sulphuric acid, afford a series of brilliant and impressive effects. When pieces of charcoal. about an inch in length, and one sixth of an inch in diameter, are brought near each other (within the thirtieth or fortieth part of an inch) a bright spark is produced, and more than half the volume of the charcoal becomes ignited to whiteness; and, by withdrawing the points from each other, a constant discharge takes place through the heated air, in a space equal at least to four inches, producing a most brilliant ascending arch of light, broad, and conical in form in the middle. When any substance is introduced into this arch, it instantly becomes ignited; platina melts as readily in it as wax in the flame of a common candle; quartz, the sapphire, magnesia, lime, all enter into fusion: fragments of diamond and points of charcoal and plumbago, rapidly disappear, and seem to evaporate in it. Such are the decomposing powers of electricity, that not even insoluble compounds are capable of resisting their energy: for glass, sulphate of baryta, fluor spar, &c. when moistened and placed in contact with electrified surfaces from the voltaic apparatus, are slowly acted on, and the alkaline, earthy, or acid matter carried to the poles in the common order. the most solid aggregates, nor the firmest compounds, are capable of resisting this mode of attack; its operation is slow; but the results are certain; and sooner or later, by means of it, bodies are resolved into simpler forms of matter.

THE BLOW-PIPE.

[See Plate, No. 84.]

By the blow-pipe every effect of the most violent heat of furnaces may be produced, by the flame of a candle or lamp, urged upon a small particle of any substance. This instrument consists merely of a brass pipe about one-eighth of an inch in diameter at one end, and the other tapering to a much less size, with a very small perforation for the wind to escape. The smaller end is bent on one side. For phisophical or other nice purposes the blow-pipe is provided with a bowl or culargement, in which the vapours of the

breath are condensed and detained, and also with three or four small nozzles, with different apertures, to be slipped

on the smaller extremity.

The results of the philosophical experiments made with this instrument are beautiful and truly surprising; but some precautions are required. In describing the blow-pipe invented by him. Mr. Newton remarks that it has been very generally used to obtain a high temperature, by THE COM-BUSTION OF OXYGEN AND HYDROGEN GASES. The mode of rendering this instrument safe, was by rejecting all jets but such as were of a very fine bore; and as any inflammation of gases may be arrested in its passage by an aperture sufficiently minute, all danger of the return of the flame was thus obviated. A desire, however, to increase the heat, has occasionly led to the use of tubes through which the flame could recede, and an explosion has consequently happened to apparatus, to the destruction of the instrument, and the danger of the experimentalist.

Doctor Clarke, professor of mineralogy in the University of Cambridge, observes on this head, that the experiments should be made with tubes, whose diameters are, at the least, equal to 6-60th of an inch, because the heat is thus rendered incomparably greater: but, as the danger is also greate er. it is necessary to devise some expedient, by which, making allowance for the probability of an explosion, the operator may be protected from injury. His contrivance to afford him perfect security, whatever explosion may happen. consists merely of a screen, made of deal planks, about 14 inch thick, and reaching about 12 feet from the floor of the laboratory, so constructed that the one half opens like a door, the other half remaining fixed. The blow-pipe is placed behind the half that is fixed; and a small hole is bored through this half, barely large enough to allow the jet and stop-cock to pass through.

The instrument, thus secured, is represented in the plate. A B is the deal screen in two parts; A being made to open, and B a fixture,—before the window C. D represents the gaseous reservoir of the blow-pipe. E, the bladder containing the gaseous mixture for compression. F, the hand of the operator upon the stop-cock of the jet, on the outside of the screen. G H, a tube of glass, or of brass, for the jet.

And I, the spirit lamp for igniting the gas.

Among the many very curious experiments made with the blow-pipe by Dr. Clarke, the following may be adduced as examples. Several oriental rubies being placed on charcoal, their fusion was so rapid that he feared they would volatilize. They ran together into a bead, and remained in such a liquid state before the gas, that the current of it penetrated like a stream of air upon oil, when urged by a pair of bellows. The bead, when examined, was white and opaque; all colour having disappeared. Being again exposed to the ignited gas, and taken from the charcoal by iron forceps, its surface was covered by a thin flaky metallic substance, which came off on the fingers, glittering like scales of carburet of manganese. On being fused a third time, it assumed a variety of shapes, like sapphire during fusion. The reduction of the oxide of tin afforded an easy and very beautiful experiment. Wood-tin, exposed to the ignited gas, communicated a beautiful blue colour, like that of violets, to the flame. In employing a pair of iron forceps, as a support, the iron became covered with an oxide of tin of incomparable whiteness. The fusion was rapid; and when the wood-tin was placed on charcoal, the metal was revived in a pure and malleable state.—In effecting the fusion and combustion of platinum, the largest drops which fell from the melting of platinum wire, when exposed to the utmost heat, weighed ten grains; but drops of metal weighing fourteen grains were obtained, when the current of gas was diminished so as not to let the metal run off toe quickly from the wire. By placing several globules on a piece of charcoal, and suffering the whole force of the gas to act upon them, the metal was made to boil, and they all ran together into one mass.

THE SAFETY LAMP.

The invention of the wire-gauze-safe-lamp, for preventing explosions from fire damp, and for giving light in explosive atmospheres, is due to Sir Humphrey Davy, who remarks that the dreadful accidents of explosions are occasioned by the firing of light carburetted inflammable gas, which is disengaged during the working of the coals, and from fissures in the strata; and which, when it has accumulated so as to form more than 1-13th part of the volume of the atmospherical air, becomes explosive by a lighted candle,

or by any kind of flame. The apertures in the gauze should not be more than 1-20th of an inch square. As the fire damp is not inflamed by ignited wire, thickness of the wire is not of importance, but wire from 1-40th to 1-60th of an inch in diameter is the most convenient. If the wire of 1-40th is found to wear out too soon in practice, the thickness may be increased to any extent; but the thicker the wire, the more the light will be intercepted, for the size of the apertures must never be more than 1-20th of an inch square. In the working models which he has sent to the

mines, there are 748 apertures in the square inch. When the wire-gauze-safe-lamp is lighted and introduced into an atmosphere gradually mixed with fire-damp, the first effect of the fire-damp is to increase the length and size of the flame. When the inflammable gas forms as much as 1-12th of the volume of the air, the cylinder becomes filled with a feeble blue flame, but the flame of the wick appears burning brightly within the blue flame, and the light of the wick continues till the fire-damp increases to 1-oth or 1-5th, when it is lost in the flame of the fire-damp, which in this case fills the cylinder with a pretty strong light. long as any explosive mixture of gas exists in contact with the lamp, so long it will give light, and when it is extinguished, which happens when the foul air constitutes as much as 1-3d of the volume of the atmosphere, the sir is no longer proper for respiration, In cases in which the firedamp is mixed only in its smallest explosive proportion with air, the use of the wire-gauze-safe-lamp, which rapidly consumes the inflammable gas, will soon reduce the quantity below the explosive point; and it can scarcely even bappen, that a lamp will be exposed to an explosive mixture containing the largest proportion of fire-damp; but even in this case the instrument is absolutely safe; and should the wires become red hot, they have no power of communicating Should it ever be necessary for the miner to work for a great length of time in an explosive atmosphere. by the wire-gauze safe-lamp, it may be proper to cool the lamp occasionally by throwing water upon the top, or a little cistern for holding water may be attached to the top, the evaporation of which will prevent the heat from becoming excessive.

THE GAS-LIGHT APPARATUS.

This apparatus consists of an iron retort, about 3 feet long, and two feet in diameter, open at one of its extremities, to which is screwed, by means of a flaunch, a door piece: to this the door is applied, and is shut close by a screw placed in the centre. The coals to produce the gas are shut up in the retort, and the whole heated to redness by a fire applied underneath, the retort being placed in a sort of oven or furnace, so that the heat surrounds every part, except that at which the coals are introduced. Around the space of this oven a flue leads from it to the chimney, the aperture of which is regulated by a small damper. plate of cast iron preserves the retort from being injured by the intensity of the fire underneath it, and causes it to be heated more uniformly. A cast iron pipe conveys all the volatile products of the coal to a refrigeratory of cast iron, in which the tar, &c. extracted from the coal are deposited, and whence they can be drawn off by means of a copper pipe. The gas is conveyed from the refrigeratory to the top of a cylindrical vessel or receiver, which is in that part air tight: consequently the gas displaces the water in this receiver, to a level with the small holes made round its inferior edges, where it is suffered to escape, and rises in bubbles, through the water of the well, into the receptacle or gasometer.

This gasometer is made of wrought iron, and is capable of rising, or of sinking down nearly to a level with the top of the well which contains the water, when it will consequently be nearly filled with that fluid; but it rises gradually as the elastic gas enters it from the pipe, and displaces the water. Weights are suspended to balance and keep it steady: it is strengthened withinside by two sets of iron stays; its seams are luted to make them air tight; and it is well painted inside and outside to preserve it from rust.

The use of the gasometer is to equalize the emission of the gas, which issues from the retort more quickly at some times than at others. When this happens, the vessel rises up to receive it; and when the stream from the retort diminishes, the weight of the gasometer expels its contents, the balance weight not being quite so heavy as the gasometer, in order that a suitable pressure may be exerted to force

the gas out at the burners with a proper jet.

The gas, after it leaves the deposit vessel, and before it reaches the gasometer, is passed through a vessel of limewater, to deprive it of every bituminous and sulphureous smell. From the gasometer it enters a tube by small holes made at its top, and, passing on through other tubes, is conveyed by pipes to the burners, or lamps, where it is to be consumed. These burners are formed in various ways. either by a tube ending with a simple orifice, at which the gas issues in a stream, and, if once lighted, continues to burn with a steady and regular light as long as any gas is supplied At other times a number of very minute holes are made in the end of a pipe, which form as many jets de feu, and have a very brilliant appearance. If the gasometer of a gas-light aparatus has a diameter of five feet by seven feet high, it will contain a sufficient quantity of gas, at four cubic feet per light, per hour, to give forty hours light to a brilliant Argand lamp, or five hours to eight lamps, equal in intensity to one hundred and sixty common street oil lamps. Such a gasometer will be filled by the distillation in the retort of about half a bushel, or a quarter of a hundred weight, of coals. The remains which are found in the retort, after the process is finished, consist of most excellent coke, which in value, for culinary fires, or manufactories, returns a considerable portion of the whole expences.

The experiments made by Mr. Brande, in a small gas apparatus erected in the laboratory of the Royal Institution, lead to the conclusion, that a chaldron of good Wallsend Newcastle coals would afford from 17,000 to 20,000 cubic feet of gas; but the process of distillation, as it has been carried on in the large establishments for lighting the metropolis, has seldom afforded a larger average produce than 12,000 cubic feet. There can, however, be little doubt that, by improvements in the construction and management of the retorts, the highest of the above averages may be obtained. In the month of April, 1816, at the three stations belonging to the chartered Gas-light Company, situated in Peter-street, Westminster, in Worship-street, and in Norton-Fulgate, twenty-five chaldrons of coals were daily carbonized, actually yielding 300,000 cubical feet of gas, equal to

the supply of 75,000 Argand's lamps, each lamp giving the light of six wax-candles. If the full proportion of gas had been obtained, namely, 20,000 cubic feet from each chaldron of coals, the produce would then have been 500,000 cubic feet, equal to the supply of 125,000 lamps of the same size; and the light then afforded would have equalled that of 750,000 wax-candles, instead of 450,000, which was the real produce. Including that of the City Gas-works. in Dorset street, Blackfriars Bridge, the total daily consumption of coals in London, for the purpose of illumination, then amounted to 28 chaldrons, and the number of lights supplied to 76,500; but this amount has been since greatly augmented, and this invaluable discovery, which now bestows an additional lustre on our theatres, &c. &c. is rapidly communicating its benefits to every part of the United Kingdom.

LONDON WATER-WORKS.

Among works of great magnitude, and displaying a vast ingenuity in their contrivance, may be cited those of the various companies for supplying the metropolis with water, the modes of forcing which into the main pipes, at the heads of the respective establishments, and thence conveying it, by subordinate pipes, through the different streets, so as to afford an ample supply to the inhabitants, as well as to provide against fires, may be reckoned among the most useful of the wonders of art.

The NEW RIVER WORKS at Islington claim the earliest notice, as having supplied the capital with pure water for nearly two centuries, at an original cost to Sir Hugh Middleton of £500,000. The reservoir is eighty-five feet above the level of the Thames; but, to give it the necessary force, it is raised thirty-five feet above that level, whence it rises into the second and third stories of most houses. The quantity it discharges every twenty-four hours is 214,000 hogsheads of sixty-three gallors each. There are besides, the London-bridge water-works, in which a toring engine serves the purpose of a high level, but the water is not strained nor purified; the York-buildings works; the East London works; the South London; the West Middlesex, at Hammersmith and Kensington, on a grand scale, with contrivances for purifying the water; and the

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GRAND JUNCTION WORKS, at Paddington. Iron pipes have been latterly substituted for wooden ones; and the general arrangements for the distribution of the water, are such as far surpass those of any similar establishments in the different capitals of Europe.

THE DIVING-BELL.

This invention, by the means of which an operator descends to any depth of water, and remains there for several hours, is founded on the elasticity of the air. Weights are placed at the bottom to prevent it from turning; and a forcing pipe sends in fresh air, to supply the waste of vital

air from the respiration of the operator.

The sinking and raising of the diving-bell, invented by Dr. Halley, depending entirely on the people at the surface of the water, and being besides of considerable weight, so as to occasion much labour, with a risk of the breaking of the rope by which it was to be raised, to the sure destruction of those within, a diving-bell has been invented by Mr. Spalding, of Edinburgh, to remedy these defects, and prevent the edges of the maclane from being entangled by any ragged prominences of rock. His machine is of wood. suspended by ropes, and having leaden weights appended to it, by which the mouth of the bell is kept always parallel to the surface of the water, whether the machine, taken altogether, is lighter or heavier than an equal bulk of water. By these weights alone, however, the bell would not sink : another is therefore added, which can be lowered or raised at pleasure, by means of a rope passing over a pulley, and fastened to one of the sides of the bell. As the bell descends, this weight called by Mr. Spalding the balanceweight, hangs down a considerable way below the mouth of the bell. In case the edge of the bell is caught by any obstacle, the balance-weight is immediately lowered down, so that it may rest upon the bottom. By this means the bell is lightened, so that all danger of oversetting is removed: for being lighter, without the balance-weight, than an equal bulk of water, it is evident that the bell will rise as far as the length of the rope affixed to the balance-weight This weight, therefore, serves as a kind of anchor to keep the hell at any particular depth which the

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NOTE.—The reader of this Volume will perceive that it is mispaged in several instances. It is in accordance with the London Copy—The errors were not discovered until the table of contents, &c. rere struck off. It was then too late to correct.



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